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In ordinary life situations, tensions occur in daily peaks ; they are not continuous. This was fully realized when Nidar was formulated. In contrast to other agents, the action of Nidar is neither too short nor too long. It is neither too potent nor too weak. Nidar controls tensions when they occur.

THE ARMOUR LABORATORIES
(ARMOUR & COMPANY LTD.)
Hampden Park, Eastbourne, Sussex
TELEPHONE : HAMPDEN PARK 740 *TELEGRAMS :* ARMOLAB, EASTBOURNE

OPENING A NEW AND QUICKER RELIEF FOR SKIN DISORDERS

The effectiveness of
Hydro-Adreson Ointment
is due to

★ *the hydrocortisone being included in*
★ ***the Neutral Base,*** *thus any skin irritation due to acidity or alkalinity is avoided.*
★ ***The Smooth and Pliable Consistency*** *which allows adequate coverage without additional injury from friction to already damaged tissue.*

This special bland base is free from excessive greasiness.

The Hydrocortisone it contains is now the acknowledged treatment of choice in many skin disorders.
Hydro-Adreson effectively reduces hyperaemia and oedema, relieves pain, and dries up exudative areas. By rapidly relieving irritation the ointment reduces the risk of further damage and infection from scratching and speeds the healing of lesions.

Hydro-Adreson (hydrocortisone free alcohol) ointment is supplied in tubes of 5gm. or 15gm. in two concentrations of 1% (10mg. per gm.) or 2·5% (25 mg. per gm.).

ORGANON LABORATORIES LTD.
BRETTENHAM HOUSE, LANCASTER PLACE, LONDON, W.C.2.
Telephone: TEMple Bar 6785/6/7. 0251/2. Telegrams: Menformon, Rand, London

A cough elixir for the relief of coughs associated with the upper respiratory tract

Over many years this elixir has proved to be one of the best of its kind in the treatment of troublesome and irritating coughs, and particularly acute and chronic bronchitis and cough associated with pulmonary tuberculosis. A ¼ grain of Codeine Phosphate in each fluid drachm has a mild analgesic effect and also helps to induce sleep. The cough reflex is depressed by the action of the Codeine and combined with Terpin Hydrate, Menthol and Pine Oil, together with other essential oils, the resulting elixir assists expectoration, is distinctly sedative and engenders a warming and soothing feeling immediately a dose has been taken.

ELIXIR OF TERPIN WITH CODEINE
(WOOLLEY)

FORMULA: Codeine Phosphate B.P., ¼ grain. Terpin Hydras P.B.C., ¼ grain. Menthol B.P., 5/32 grain. Oil of Pumilio Pine B.P.C., 1/24 minim. Eucalyptol B.P.C., 1/16 minim. Glycerin B.P., 20 minims. Syrup B.P., 15 minims. Alcohol B.P. 90%, a sufficiency. Flavour and colour, a sufficiency. Water to 1 fluid drachm. DOSE: 1 to 2 teaspoonfuls diluted with water.

POISON | P.L.

Available in bottles containing 10 fl.oz., 20 fl.oz., 40 fl.oz., 80 fl.oz., 8/6, 15/5, £1/8/8, £2/15/- each, less professional discount, quantities of 10 fl. oz. and upwards are Dispensing Packs exempt from Purchase Tax.

JAMES WOOLLEY SONS & CO., LTD., Victoria Bridge, Manchester 3
in association with J. C. ARNFIELD & SONS, STOCKPORT

WT 1

For the 'bilious' or 'liverish' patient

DEHYDROCHOLIN B.D.H.

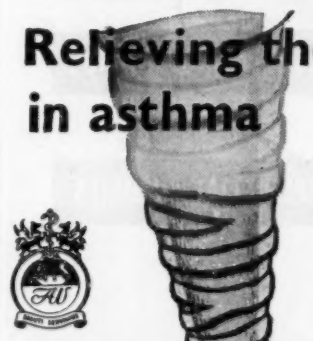
Tablets for oral administration, each containing 0.25 gramme of dehydrocholic acid in bottles of 20 at 3/- and 100 at 13/-. Basic N.H.S. prices

Literature and samples are available to physicians on request

THE BRITISH DRUG HOUSES LTD. (MEDICAL DEPARTMENT) LONDON N.1

DHYD/E/541

Relieving the bronchial tree in asthma



'ASMAC' TABLETS are formularized to provide symptomatic relief of the bronchial tree both during actual dyspnoeic attacks of bronchial asthma, and during remissions.

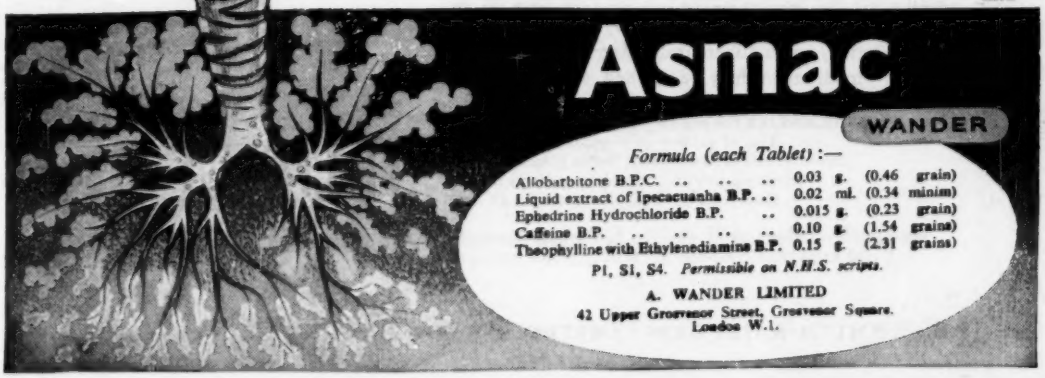
'Asmac' Tablets combine in a single prescription 'official' drugs recognized for their reliability to effect mental sedation, decongestion, expectoration and bronchodilatation.

Packs and Cost to Pharmacists:

Standard Tube of 20: 3/-

Dispensing Bottles:
100, 12/-; 500, 52/6; 1000, 102/6

M.573.



Asmac

WANDER

Formula (each Tablet):—

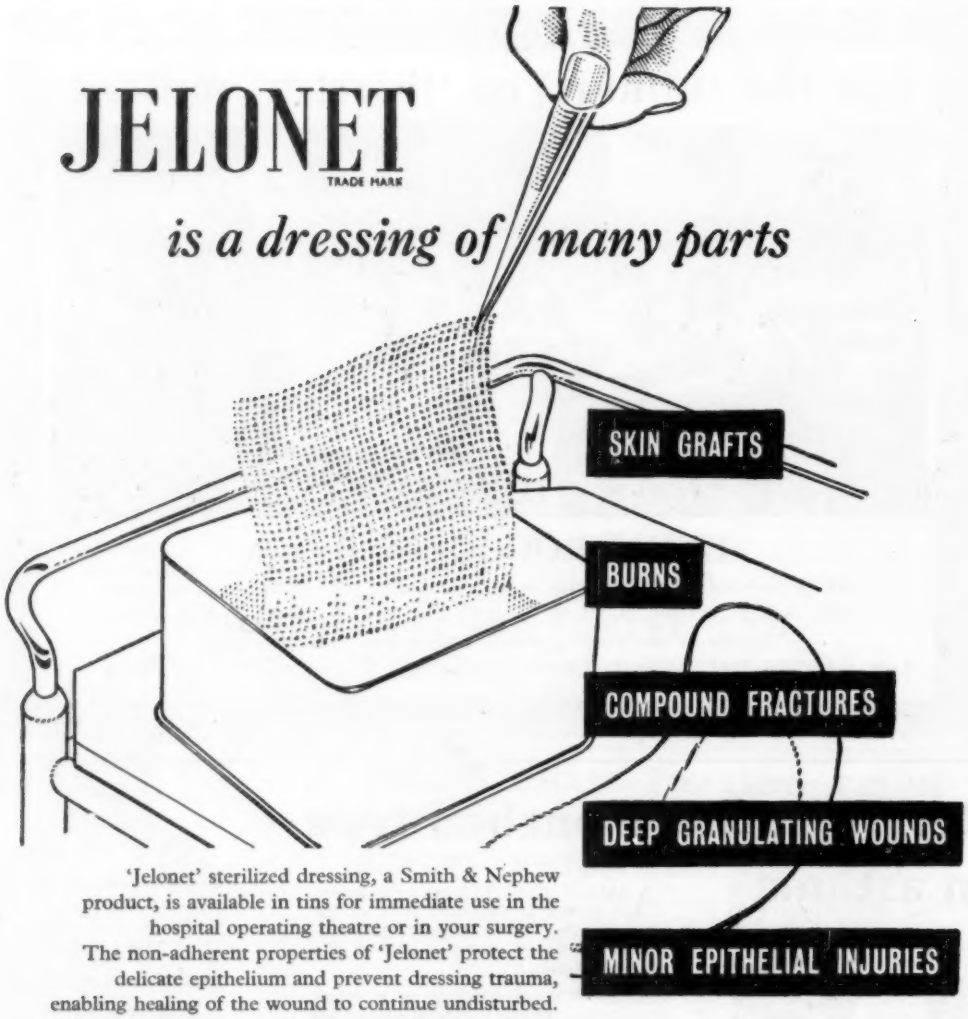
Allobarbitone B.P.C.	0.03 g.	(0.46 grain)
Liquid extract of Ipecacuanha B.P.	0.02 ml.	(0.34 minim)
Ephedrine Hydrochloride B.P.	0.015 g.	(0.23 grain)
Caffeine B.P.	0.10 g.	(1.54 grains)
Theophylline with Ethylenediamine B.P.	0.15 g.	(2.31 grains)

P1, S1, S4. *Permissible on N.H.S. scripts.*

A. WANDER LIMITED
42 Upper Grosvenor Street, Grosvenor Square, London W.1.

JELONET
TRADE MARK

is a dressing of many parts



'Jelonet' sterilized dressing, a Smith & Nephew product, is available in tins for immediate use in the hospital operating theatre or in your surgery. The non-adherent properties of 'Jelonet' protect the delicate epithelium and prevent dressing trauma, enabling healing of the wound to continue undisturbed. 'Jelonet' dressings are made from specially woven open-meshed gauze, thoroughly and evenly impregnated with soft paraffin containing 1.235 per cent. Balsam of Peru. Because 'Jelonet' is compatible with all antibiotics and medicaments, it is the ideal base for all combined dressings. Thus, by keeping a tin of 'Jelonet' handy, a non-adherent dressing and the desired medicament may be applied simultaneously.

AVAILABILITY *For prescription on N.H.S form E.C.10*
Tins of 5, 10 or 36 pieces (non interleaved)
Tins of 36 pieces (interleaved) Single pieces in sealed envelopes (sterilized for use in patients homes)
Each piece $3\frac{1}{4}$" x $3\frac{1}{4}$" (9.52 cms x 9.52 cms)

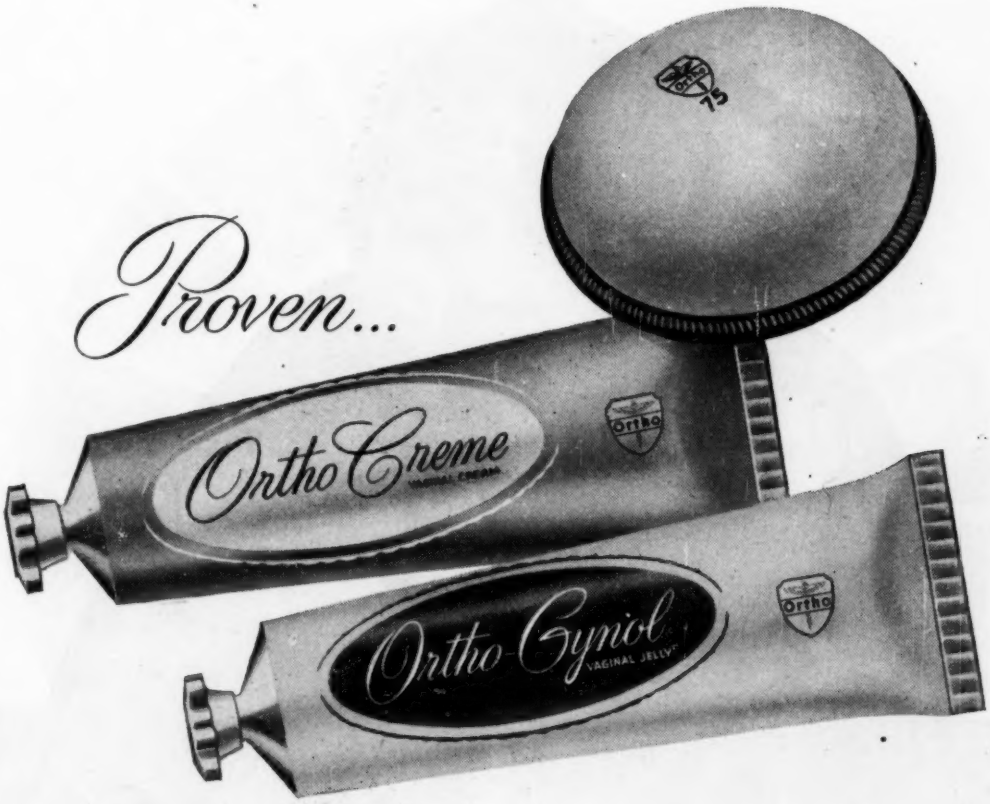
For hospital use only
8 yard strips (folded zig-zag) $3\frac{1}{4}$" wide (7.31 m x 9.52 cms)

JELONET
TRADE MARK

PARAFFIN GAUZE DRESSING B.P.C

an S&N product

SMITH & NEPHEW LIMITED · WELWYN GARDEN CITY · HERTS



...for dependable conception control

with the Ortho Diaphragm

Ortho

Ortho Pharmaceutical Limited · High Wycombe · England

Recommendation without reservation

IN THE transition from a milk diet to milk-plus-solids, the starchy portion of a baby's diet is often increased at the expense of milk and the valuable proteins which milk contains. The ideal first cereal, therefore, should provide not just extra solids but solids in the form of first-class protein.

To this end the vegetable protein of the oat flour in Trufood Cereal Food has been supplemented by milk proteins and important mineral salts. In this way the total protein has been raised to 6.05 grammes per ounce or 21.4%, and the casein and lactalbumin form a valuable complement to the biological value of the total protein.

The Trufood Creameries and Laboratories are at Wrenbury in Cheshire. Full information on any Trufood product is available from Trufood Limited, 113 Newington Causeway, London, S.E.1.

TRUFOOD Cereal food

A PRE-COOKED CEREAL FOOD ENRICHED WITH MILK PROTEINS

TFD 92-1903-100

an all-round defence against

in all its phases

The relief of pain is rightly the patient's just insistence. Effective alleviation may be obtained in many pain producing conditions which increase seasonally. Rheumatism, lumbago, arthritis, coryzal and influenzal aches are but some of the common ailments which call for a rapid form of therapy. Hypon Tablets fulfil the requirements of a safe analgesic without any untoward side effects being experienced. Caffeine and phenolphthalein present in Hypon Tablets ensures a preparation which is the best in its category

FORMULA: *Acid Acetylsalicyl B.P. 40.22% Phenacet. B.P. 48.00% Caffein B.P. 2.00% Codein. Phosph. B.P. 0.99% Phenolphthal. B.P. 1.04% Excip. 7.75% (each tablet 8 grains)*

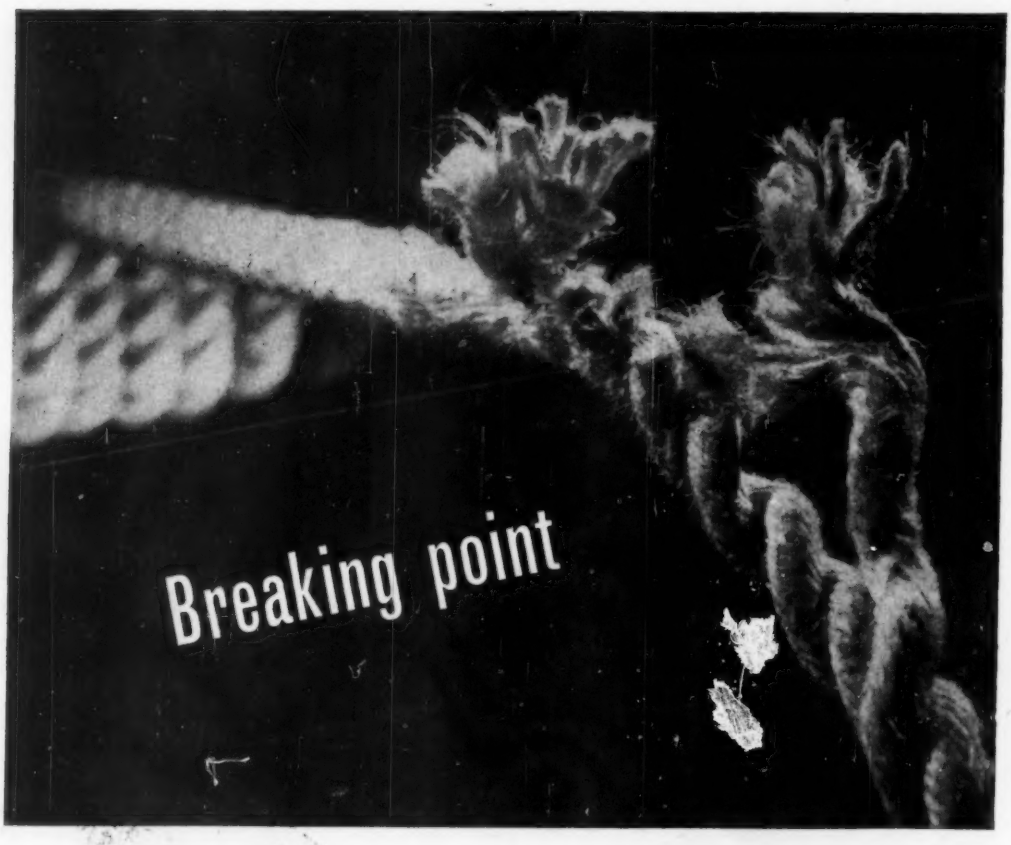
HYPON TABLETS

Prescribe Hypon Tablets by name

CALMIC LIMITED, CREWE. *Phone CREWE 3251-5* **LONDON:** *2 Mansfield St., W.1. Phone LANgham 8038-9*

AUSTRALIA : 458-468 Wattle Street, Ultimo, Sydney, N.S.W. **CANADA** : Terminal Building, York St., Toronto.

H2



in nervous tension and anxiety neuroses

'MEPAVLON', I.C.I.'s new tranquilliser, is distinguished by its ability to relieve both mental and muscular tension without dulling consciousness. It has proved to be particularly suitable for calming the nervous patient troubled with anxiety, restlessness and irritability. In such cases, 'Mepavlon' stabilises the emotions, relaxes tension and relieves nervous insomnia by inducing natural sleep. No less important: its toxicity is low, it is well tolerated, and side effects are rare. 'Mepavlon' thus combines effectiveness with safety and provides a most satisfactory treatment for the psychoneuroses.

Fully active by mouth,'Mepavlon' is presented in tablets each 400 mgm. in containers of 30 and a dispensing pack of 250.

'Mepavlon' (meprobamate)

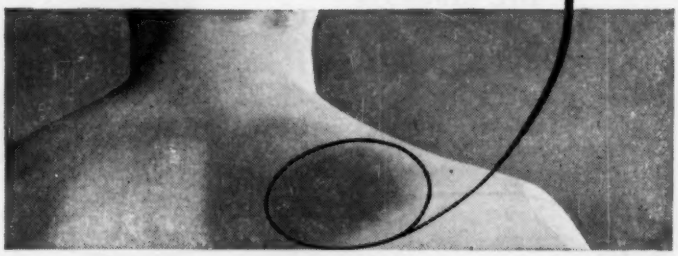
ICI

IMPERIAL CHEMICAL INDUSTRIES LIMITED Pharmaceuticals Division Wilmslow Cheshire

Ph. 723

Rubriment relieves pain in such conditions as muscular rheumatism, fibrositis, strains and sprains.

Some minutes after application the skin becomes flushed and there is a comforting feeling of warmth which persists for many hours.



RUBRIMENT

A new long-acting rubefacient—safe and effective

Rubriment is a product of original research.

For some years it has been known that some chemicals when applied to the skin produce redness and warmth. Rubriment is based on a new substance, the benzyl ester of nicotinic acid, which has been demonstrated to give a long-lasting rubefacient effect without any damage or irritation to the skin even after prolonged and repeated application.

Ten minutes after application of Rubriment there is a comforting feeling of warmth and the area is seen to be flushed. This redness is due to the dilatation of the small cutaneous blood-vessels. This persists, without danger of irritation to the skin. Clinical reports have been received of the efficacy of Rubriment for the relief of pain in such conditions as muscular rheumatism, lumbago, fibrositis, strains and sprains. The immediate and prolonged vasodilatory action of Rubriment also provides effective relief for unbroken chilblains.

Whenever counter-irritation is indicated, Rubriment is the preparation of choice for the patient.

Available in two forms

Rubriment (2.5% nicotinic acid benzyl ester and 0.1% Capsicin) is available either as a cream or as a liniment, both of which are non-greasy.

The cream is rapidly absorbed and needs only gentle application. *It is supplied in tubes of* 20 *g.* (*Approx.*). *BASIC PRICE to N.H.S.*, 2/2*d.*

The liniment lends itself to massage, if this is required. *It is supplied in bottles of* 2 *fl. ozs.* (*approx.*). *BASIC PRICE to N.H.S.*, 3/-.

Directions for use Apply Rubriment to the affected area. As Rubriment causes a stinging sensation in contact with the eyes and face, the hands should be well washed after use.

One application per day has been found to be effective for the majority of patients, though a fresh application may be made, if necessary, at more frequent intervals.

Rubriment is not advertised to the public and can be prescribed on form E.C.10.

RUBRIMENT

Horlicks Limited, Pharmaceutical Division, Slough, Buckinghamshire

Arch. Derm., 1951, **192**, 423. Z. ges. inn. Med., 1953, **8**, No. 3, 99. Hautarzt, 1952, **3**, No. 7, 304. Hippokrates, 1950, **14**, 378. Derm. Wschr., 1950, **122**, No. 37. Schweiz. med. Wschr., 1950, **80**, No. 44, 1180. Munch. med. Wschr., 1951, **93**, No. 44, 2209. Ther. Gegenw., 1952, **91**, No. 9, 344. Dtsch. Gesdh. Wes., 1950, **5**, No. 49, 1953. Derm. Wschr., 1951, **123**, No. 7, 145.

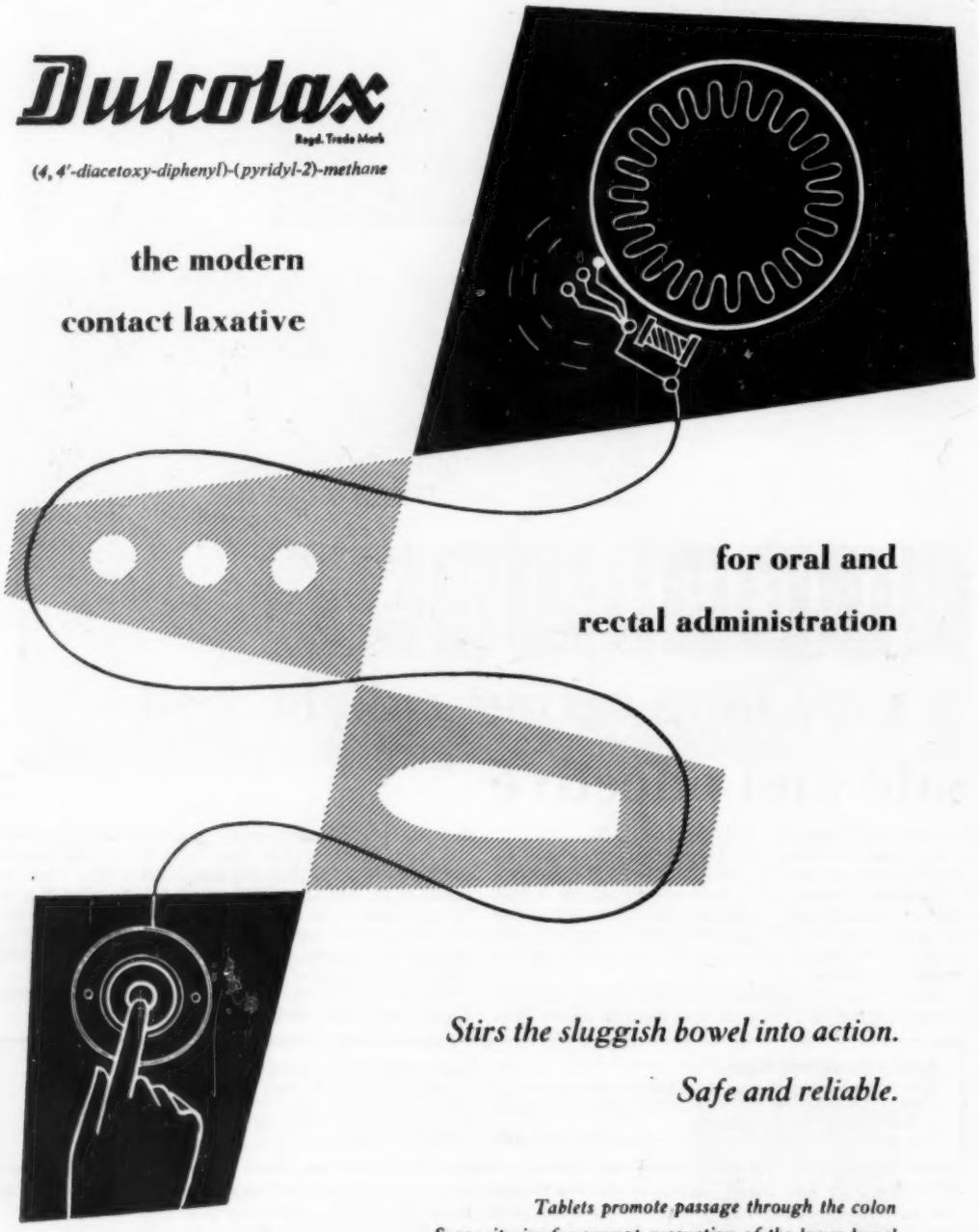
Dulcolax

Regd. Trade Mark

(4, 4'-diacetoxy-diphenyl)-(pyridyl-2)-methane

the modern

contact laxative



for oral and

rectal administration

Stirs the sluggish bowel into action.

Safe and reliable.

Tablets promote passage through the colon
Suppositories for prompt evacuation of the lower bowel

Dulcolax enteric coated tablets of 0.005 g. · Bottles of 30 and 200
Dulcolax suppositories of 0.01 g. · Boxes of 6 and 50

LEWIS LABORATORIES LTD., LEEDS 9

a completely new vaginal gel

for the treatment of Vaginitis due to

TRICHOMONAS

MONILIA

AND

BACTERIA

including Haemophilus Vaginalis, the organism often responsible for some of the so called "non-specific" infections.

sterisil TRADE MARK

Administration: One applicatorful (7 ml.) instilled into the vagina every other night. Clinical cure may result from six applications, but twelve applications should be advised.

Presentation: Sterisil is available in boxes containing a tube of vaginal gel (1½ oz.) and six disposable applicators.

Active Principle: hexetidine 0.1 %

WM. R. WARNER & CO. LTD. POWER ROAD, LONDON, W.4.

STER 257/4

EAR WAX

Removed this easy way

The removal of wax from the external auditory meatus has, in the past, normally entailed attendance by the patient for diagnosis and for the prescription of a suitable loosening agent, and a second attendance a few days later for syringing. Now, by the use of Cerumol Ear Drops, wax can be removed in most cases at one visit. A few drops of Cerumol can be instilled into the ear and, while another patient is being attended to, the soft cerumen dissolves and the harder wax disimpacts. The wax can then be removed by gentle syringing or with cotton wool. The wax may even be found to run out of the ear on its own accord, in which case patients themselves may instil Cerumol at home, obviating further attendances. Cerumol is anti-bacterial, non-irritating and harmless to the lining of the external auditory meatus or the tympanic membrane. Cerumol is included in Category No. 4 of the M.O.H. classified list and may be prescribed on N.H.S. Form E.C.10.

CERUMOL
Regd TRADE MARK

EAR DROPS

for the easier removal of wax

Distributors in U.K.
TAMPAX LIMITED, BELVUE ROAD, NORTHOLT, GREENFORD, MIDDLESEX. Telephone : WAXlow 2244

If you wish to test for yourself and have not received recently a 10 c.c. vial please write or telephone direct to :

LABORATORIES FOR APPLIED BIOLOGY LIMITED,
91, AMHURST PARK, LONDON, N.16 Telephone STAmford Hill 2252

PACKS for Surgery Use : 10 c.c. vial — separate dropper included.
(Basic N.H.S. price 2/8.)
For Hospital Use : 2 oz. and 10 oz. bottles.

"Versatile stuff, aspirin—
I see the rheumatism boys
now say it's as good as cortisone."

*"Yes, but nobody yet seems
to know how it works
or even its site of action."*

"Some professor suggested
the analgesic effect of salicylates
might be peripheral," at tissue level,
not central as we were taught."

*"Could be. That reminds me—some firm has put up a new
skin-penetrating salicylate in a vanishing cream
for local tissue pain by inunction."*

"Does it work? And isn't it irritating?"

*"Yes and no. I've used it and it works well,
even in osteoarthritis. It's not irritating at all,
just a means of using salicylate locally."*

"Sounds promising. I'd like to try it. What is it called?"

* Practitioner, 170, 313 (1953)

Algesal

10% diethylamine salicylate in a soothing vanishing cream

**non-irritant, skin penetrating salicylate
for the relief of rheumatic pain by inunction**

Full literature and samples gladly sent on request to the manufacturers:
E.G.H. LABORATORIES LTD, PERU STREET, SALFORD 3, LANCS.

WARD, CASSENNE LTD.

INDICATIONS
All Rheumatoid Conditions of mild or average severity, Allergies and Hypersensitivity.

coactyl
TRADE MARK

Buffered Tablets

The new safe and effective anti-inflammatory medication.

Recommended where corticoids alone are not justified and where salicylates or their derivatives are not sufficient.

Coactyl—has increased anti-inflammatory and pain-relieving effects due to the synergistic action of Prednisone (at very small quantities) + acetylsalicylic acid.
—side effects virtually eliminated.
—no need for constant medical supervision during treatment.
—no gastric irritation.

Coactyl is therefore the effective anti-inflammatory medication for everyday practice.

FORMULA:

Prednisone (Delta-I-Cortisone)	0.5 mgm.
Acetylsalicylic acid	300 mgm.
Aluminium hydroxide	160 mgm.
Magnesium trisilicate	30 mgm.

PRESENTATION:

Bottle of 50 buffered tablets at 12/- + Purchase tax 3/7½d

DOSAGE:

Two to four tablets,
twice to four times daily.

coactyl TRADE MARK

BUFFERED TABLETS

The anti-inflammatory medication for everyday practice.

Available under N.H.S. prescription (Form E.C.10).

WARD, CASSENNE LTD.,
116 Victoria Street, London, S.W.1

ADRENOXYL

Reduces the mean bleeding-time

Adrenoxyl reduces the mean bleeding-time by decreasing the permeability and increasing the contractility and resistance of the capillary wall.

A dry field at operation

Adrenoxyl has been successful in diminishing capillary bleeding in a wide range of surgical operations. It has proved particularly useful in ear, nose and throat, ophthalmic and plastic surgery. In plastic surgery of the face it has been reported that, post-operatively, there is less swelling and bruising when Adrenoxyl has been used.

No side effects

Adrenoxyl does not have any side effects or contraindications. It does not affect blood coagulation, blood pressure or pulse rate and does not possess any sympathomimetic properties.

In medical conditions

Adrenoxyl has been used with success in those medical conditions associated with capillary fragility.

In the British Medical Journal (April 21st, 1956) a correspondent confirmed the value of Adrenoxyl in providing a dry field for the surgeon and in shortening the duration of the operation.

Packs

Ampoules: Boxes of 6 and boxes of 50.
Each ampoule contains 0.75 mg. of adrenochrome monosemicarbazone dihydrate.

Tablets: Tubes of 25 and bottles of 500.
Each tablet contains 2.5 mg. of adrenochrome monosemicarbazone dihydrate.

The best results are obtained when both tablets and ampoules are used.

HORLICKS LIMITED

Pharmaceutical Division Slough Bucks

Literature and samples are available on request to the Medical Information Dept.

CALADRYL* provides quick and easily applied relief for irritating skin conditions. Combining the anti-pruritic and anti-allergic effects of Benadryl with the soothing mild astringency of calamine, CALADRYL LOTION, a smooth non-greasy liquid, promptly alleviates the discomfort of urticarial conditions, as well as measles and chicken pox rashes. CALADRYL CREAM, a similar formula in a water-miscible cream base, is an effective means of counteracting chapping and skin soreness due to wintry weather.

* *Trade Mark*

CALADRYL

LOTION In bottles of 4 and 80 fluid ounces

CREAM Tubes of approx. 1¼ ounces and jars of 1 lb.

Parke, Davis & Company, Ltd. (*Inc. U.S.A.*) Hounslow · Middlesex · Tel: Hounslow 2361

345

21

R-E-L-I-A-B-I-L-I-T-Y

Therapeutic blood levels of theophylline are needed to relieve asthma, and these can be achieved easily and reliably using 'Theodrox' tablets, which combine aminophylline with specially prepared aluminium hydroxide gel. The latter delays hydrolysis of aminophylline, and thereby avoids gastric irritation, an advantage which has been demonstrated by widespread clinical usage. As the aminophylline molecule is unchanged, there is no delay in onset of action, and 'Theodrox' is more effective than simple aminophylline therapy.

'Theodrox' is indicated in bronchial or cardiac asthma. It is also indicated as a diuretic in congestive heart failure, and as supplementary therapy in status asthmaticus and angina pectoris.

Each 'Theodrox' tablet contains gr. 3 aminophylline and gr. 4 aluminium hydroxide gel.

'Theodrox' with Phenobarbitone tablets contain in addition gr. ¼ phenobarbitone.

The winning Jaguar, Monte Carlo Rally, 1956.

RIKER

THEODROX REGD.

'Theodrox' (Brit. Pat. 727831) is a registered trade mark of

RIKER LABORATORIES LIMITED, LOUGHBOROUGH, LEICS.

dispelling the element of doubt

TODAY—with so many antibiotics available—it is always sound practice to specify ACHROMYCIN *by name* whenever true broad-spectrum activity is desired. In this way you are completely assured that the patient receives precisely the treatment you intend. Offered now in no less than fourteen presentations, ACHROMYCIN tetracycline is particularly widely used in capsule form. On every capsule appears the name Lederle—your finest assurance of consistent antibiotic potency and unfailing dependability.

Capsules of 50 mg.—In vials of 25 and 100. Capsules of 250 mg.—In vials of 16 and bottles of 100 and 1000

ACHROMYCIN*

*REGD. TRADE MARK

TETRACYCLINE

Also available in the following forms: **Ear Solution · Intramuscular · Intravenous · Ointment 3% · Ointment (Ophthalmic) 1% · Ophthalmic Powder Sterilized · Oral Suspension · Liquid Pediatric Drops SPERSOIDS* Dispersible Powder · Soluble Tablets · Syrup · Tablets · Troches**

Lederle

LEDERLE LABORATORIES DIVISION

Cyanamid OF GREAT BRITAIN LTD., London, W.C.2

Reproduced by courtesy of the Trustees of the National Gallery "The House of Cards" CHARDIN

A Question of Stability

For many people, the stresses and strains of everyday existence may have a profound effect on the carefully built edifices of their lives and it may take just that extra jog to bring their insecure little world tumbling about their ears.

You cannot possibly control the conditions which weaken the foundations of such patients' lives. But, by prescribing Equanil, you can provide them with a cement to rebuild a steady and more stable frame of mind out of a rubble of nebulous fears and fancies. Equanil restores repose—safely, effectively and reliably.

EQUANIL (MEPROBAMATE)

PACKS: 400 mg. tablets in containers of 20 and 250.

The word 'Equanil' is the registered trade mark of

Wyeth John Wyeth & Brother Limited, Clifton House, Euston Road, London, N.W.1

E.1

TOPICAL THERAPY WITH

'ANTHISAN' brand MEPYRAMINE MALEATE CREAM

A rapidly effective antihistamine and analgesic preparation for symptomatic relief in allergic and sensitization dermatoses and other irritant skin conditions.

Detailed literature is available on request

'BRULIDINE' brand DIBROMOPROPAMIDINE CREAM

A general purpose anti-infective cream for the prevention and treatment of infection in wounds and for the treatment of impetiginous skin conditions.

Detailed literature is available on request

'PHENERGAN' brand PROMETHAZINE CREAM WITH DIBROMOPROPAMIDINE

For the rapid control of inflammation, swelling and pain, and for the prevention and treatment of infection in burns and scalds.

Detailed literature is available on request

Supplied in collapsible tubes of 1 oz. and containers of 1 lb.

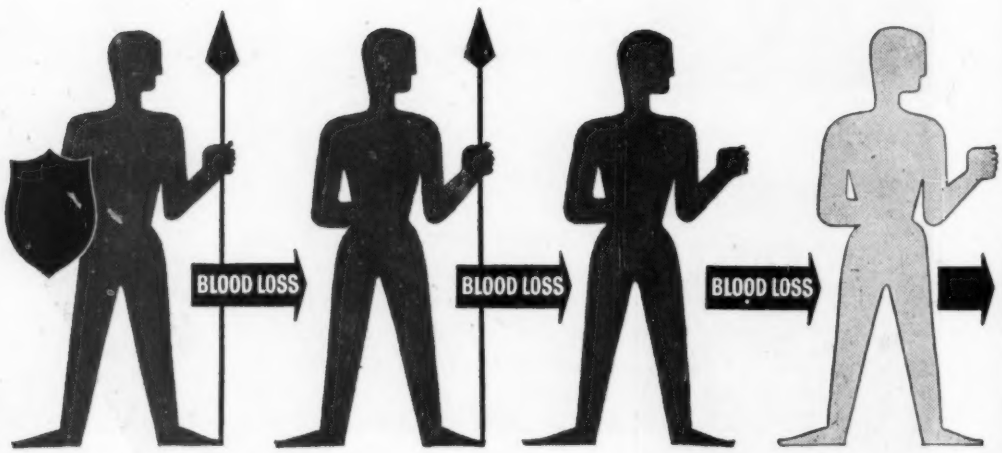
*trade mark

MANUFACTURED BY MAY & BAKER LTD

M&B *Brand Medical Products* MA.2640

DISTRIBUTORS: PHARMACEUTICAL SPECIALITIES (MAY & BAKER) LTD · DAGENHAM · ESSEX

Ferrum et scutum
Lanceaque
(cum arte)



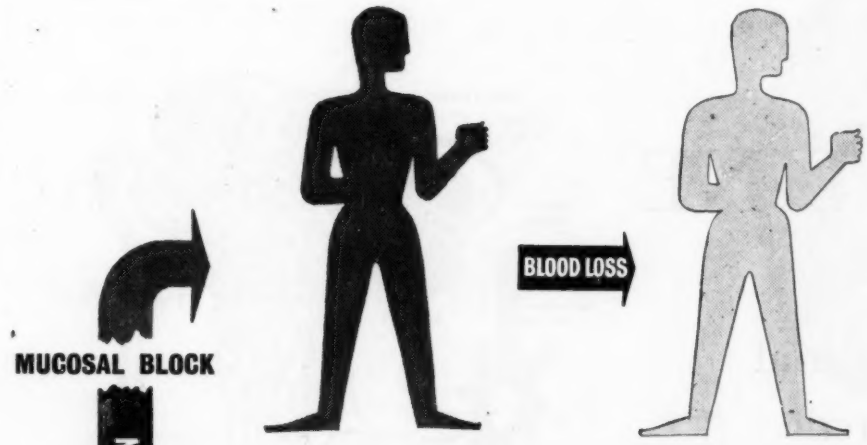
Haemoglobin normal *Body iron stores normal*	*Haemoglobin normal* *Body iron stores falling*	*Haemoglobin normal* *Body iron stores exhausted*	*Haemoglobin down* *Body iron stores still exhausted*

Suggested further reading:

Blood, 1955, **10**, 567. *Bull. N.Y. Acad. Med.*, 1954, **30**, 81.
J. Amer. med. Ass., 1956, **162**, 197. *Ann. intern. Med.*, 1955, **42**, 458.
Ann. intern. Med., 1953, **38**, 199. *J. clin. Invest.*, 1952, **31**, 543.
Brit. Encycl. Med. Pract., Med. Progr., 1956, P.47.

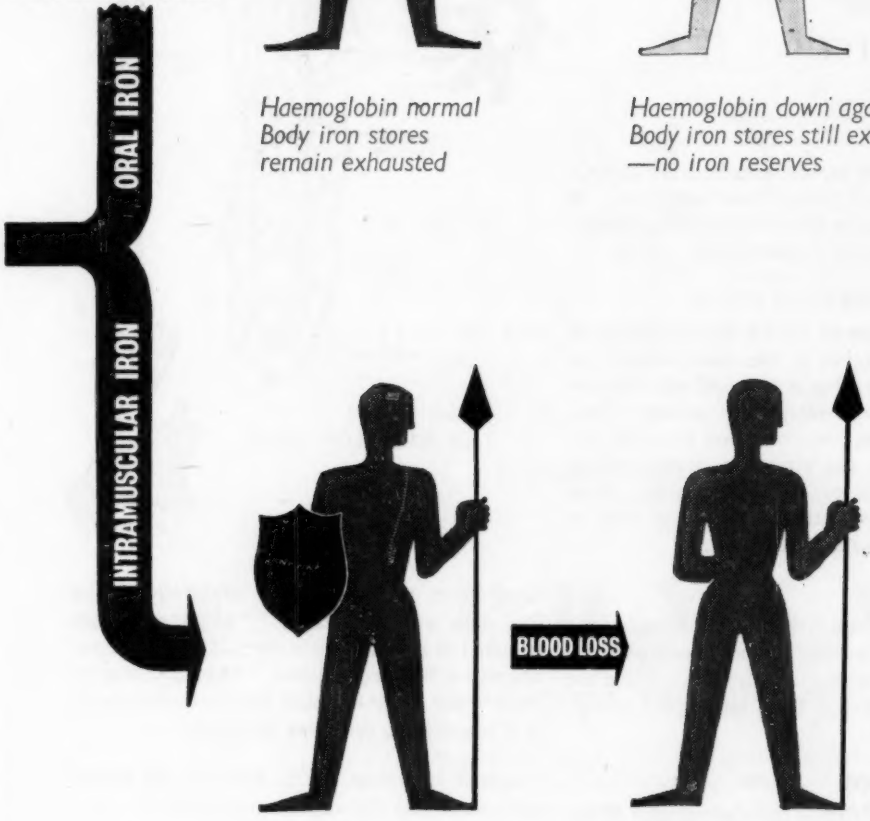
Imferon
Iron-Dextran Complex *Trade Mark*

BENGER LABORATORIES LTD., HOLMES CHAPEL, CHESHIRE PIONEERS IN PARENTERAL THERAPY



Haemoglobin normal
Body iron stores remain exhausted

Haemoglobin down again
Body iron stores still exhausted
—no iron reserves



Haemoglobin back to normal
Body iron stores back to normal

Haemoglobin normal
Body iron stores falling—but still more iron reserves

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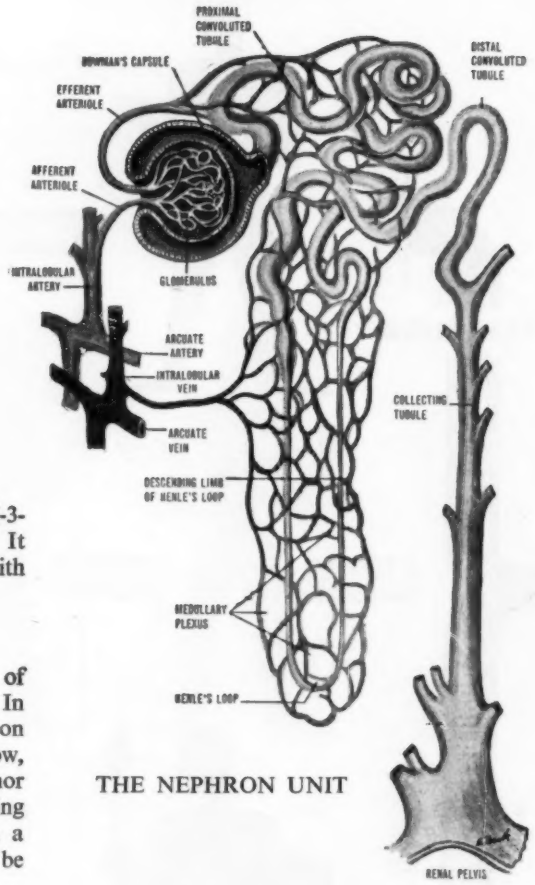

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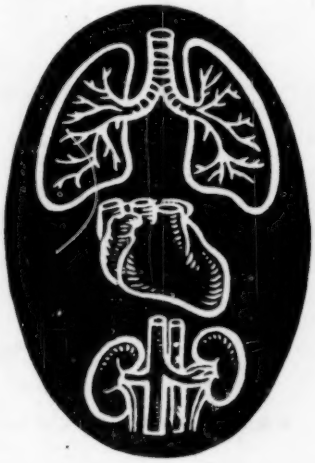

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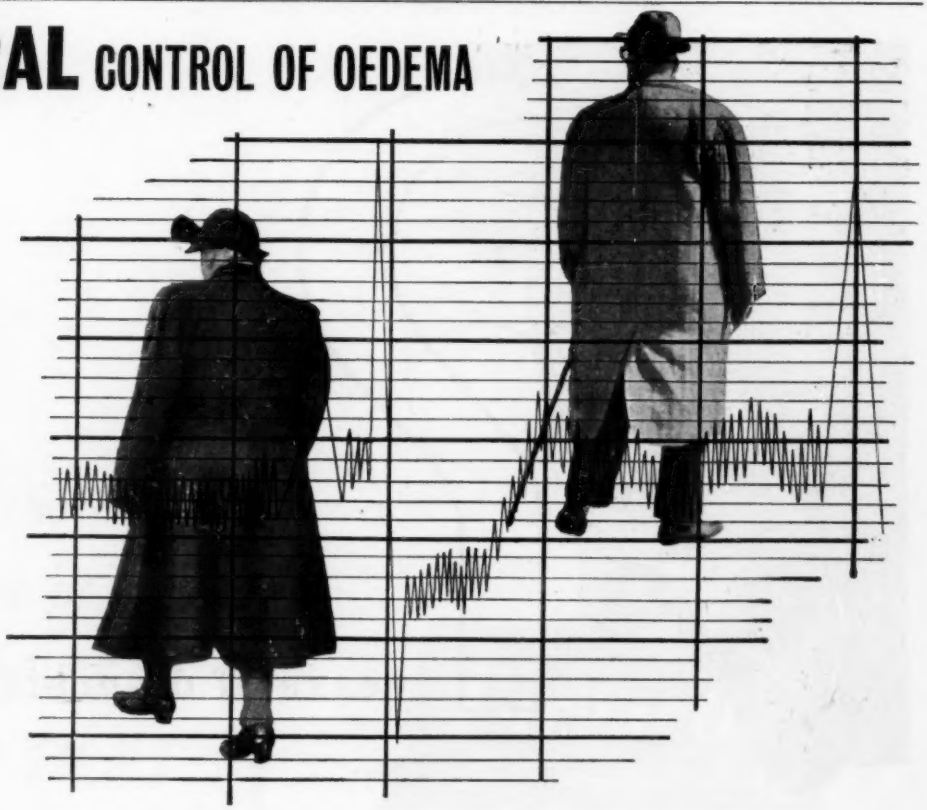

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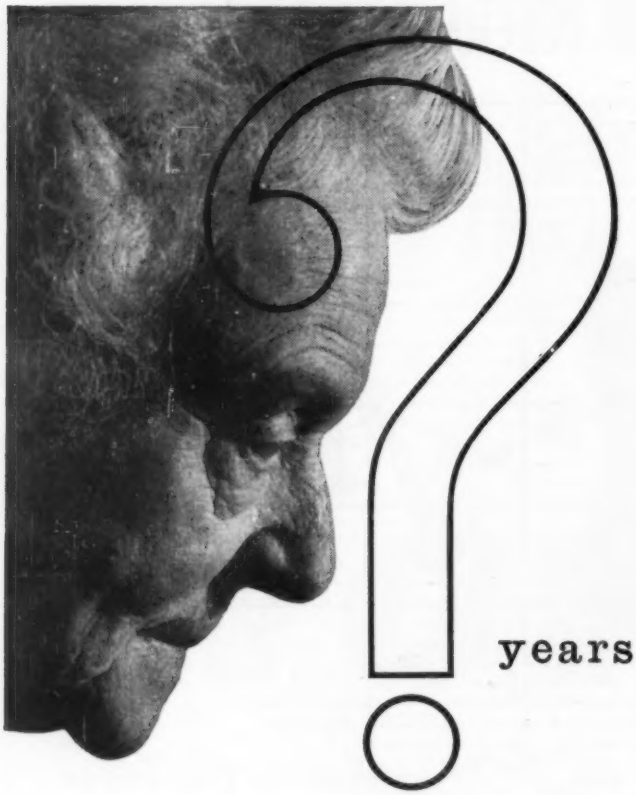

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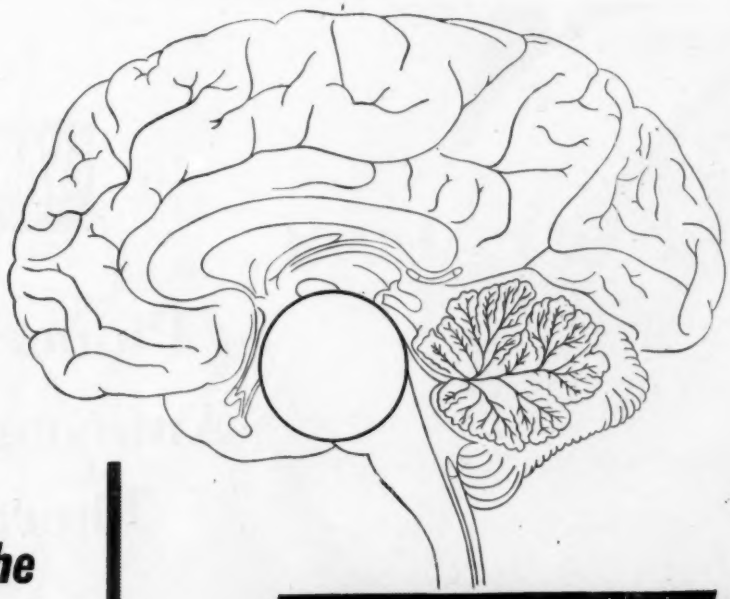

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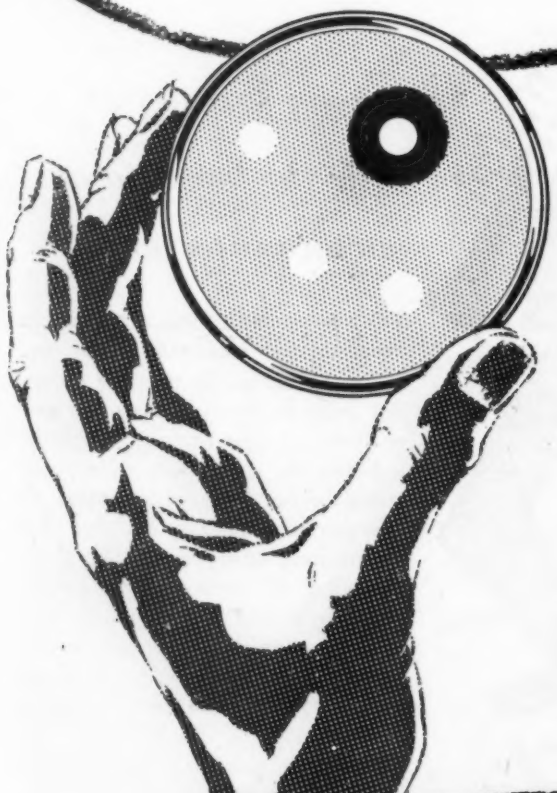

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HYPERTENSIVE STROKES

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CONSULTING PHYSICIAN,
UNITED SHEFFIELD HOSPITALS

IF a patient is fated to die from hypertension, the chances are that he will do so from heart-failure, uræmia, cardiac infarction, or stroke. Heart-failure and uræmia can usually be forecast appreciably in advance of the event, and the risk of a cardiac infarct can only be accepted philosophically as a hazard of middle life inevitably greater in a hypertensive person. A stroke, the most dreaded of all these disasters, seems to offer little or no chance of prediction, and even the cause of cerebral hæmorrhage in hypertension remains to a large extent speculative.

Apart from the observation of Pickering (1955) that "cerebral hæmorrhage seems to be more common in subjects with very high pressure," the patient who has the stroke seems to have received remarkably little attention; but this perhaps is not altogether surprising, for it is unusual for much to be known about a hypertensive patient before he has his stroke. A group of hypertensive patients under regular observation since 1946 has, however, now provided an opportunity to study, at least on a modest scale, the clinical antecedents of cerebral vascular accidents.

The total number of patients in this group was 234, of whom 95 (40·6%) were men and 139 (59·4%) women. The present status or fate of all of these is known, and the survivors have been regularly re-examined at least annually. None of the patients was aged more than 60 when first examined; only 44 exceeded this age at their last examination or at the time of their death; and in every case the diastolic pressure exceeded 100 mm. Hg on the occasion of their first examination. No patient in this group received effective hypotensive treatment, but this is not so reprehensible as it may seem, for during much of the time covered by these observations modern drug treatment was far from established and none of the patients was considered suitable for, or was willing to undergo, surgical treatment.

During the ten years covered by this study 97 (41·4%) of the 234 patients died as a consequence of hypertension,* and stroke, which accounted for 41, was easily the commonest cause of death. In addition to these 28 other patients had strokes which they survived. Since, however, the particular concern of this investigation was with cerebral vascular accidents, which occur at a relatively early age, this report is confined to an analysis of the 56 patients who had a stroke before the age of 60, 31 cases in which the stroke was fatal (group I) being considered separately from 25 cases where it was survived (group II). The clinical state of all these patients having been subject to regular review up to the time of their having a stroke, it was hoped that it might thus be possible to recognise among them a common clinical pattern which would be useful in future prediction of these catastrophes.

It was, however, obviously desirable that the clinical features of these two groups should be further contrasted with a "control" series of patients who had survived appreciably longer without experiencing a stroke; but, to be of any value, it was clear that this must consist as far as possible of hypertensive cases of comparable severity. Accordingly the control group (group III) was limited to 32 patients with diastolic pressure of 130 mm. Hg or higher who had survived unscathed an average of seven years beyond the average age at which strokes developed in the first two groups. Thus three groups of patients have been compared in fig. 1, which records the percentage incidence in each group of clinical features which normally provide a basis for assessing the severity of hypertensive disease.

The somewhat meticulous grading of diastolic pressure seems to have been justified by events, but any classification of hypertensive patients according to blood-pressure has limitations because of the notorious instability of blood-pressure, especially in the higher ranges; though this source of error can be reduced if records are made only under "basal" conditions. However, readings obtained in this way appear somewhat unrealistic and are likely to bear little resemblance to blood-pressure during hours of normal activity. Consequently, throughout this study, measurements have been taken under standardised conditions of rest alone, being recorded as the average pressure in both arms, in lying and standing positions. Since the influence of high blood-pressure is likely to be related to "peaks" rather than "troughs" of blood-pressure, the individual blood-pressures which form the basis of comparison in fig. 1 represent the highest readings of systolic and diastolic pressure among those obtained in this manner at the first and last routine examinations of each patient.

In fig. 1 hearts are described as enlarged when the cardio/thoracic ratio is greater than 1 : 2; comparison of electrocardiograms is based on the appearance of "strain pattern"; and ophthalmoscopic examinations report only the incidence of papilloedema, on the one hand, and of retinal exudates and hæmorrhages, on the other, since clinical records have not allowed more accurate differentiation of the retinal appearances. The remaining points of comparison scarcely need clarification, except that the criterion for "fixed specific gravity" was failure to concentrate urine after twelve hours' deprivation of fluid, and that "family history" refers to the occurrence before the age of 70 of a stroke in a parent, a brother, or a sister. Apart from records of blood-pressure the comparison is invariably based on the clinical findings either at the patient's last examination before the stroke or at the most recent routine examination in the case of the patients in group III.

Results

Possibly the first impression gained from this survey is that there appears to have been justification for considering fatal and non-fatal strokes as distinct clinical entities, because analyses of these two groups of patients differ appreciably. However, the main purpose in presenting fig. 1 is to compare each of these groups individually with the controls, because if enlightenment is forthcoming at all it should emerge from these comparisons.

Comparison of Group I with Group III (fig. 1)

The following five features in particular appeared with notably greater frequency among patients in group I than in the controls:

	Prevalence	
	Group I	Group III
Diastolic pressure exceeding 149 mm. Hg	68%	18%
Gross albuminuria	29%	3%
Diminished urea-clearance	30%	9%
Papilloedema	22%	0%
Urea retention	10%	0%

Figuring also more prominently in this group were higher systolic pressures, slight albuminuria, retinal exudates and hæmorrhages, abnormal electrocardiograms, and patients of normal weight, but in all these instances the difference in prevalence was considerably less impressive. It is improbable also that the higher male representation (39%) in group I has any significance, for among the total of 426 hypertensive patients attending the clinic the proportion of men was very similar to this (42%),

* Stroke 41, uræmia 29, congestive failure 13, cardiac infarction 12, ruptured aorta 2.

and the dearth of men eligible for the control group was entirely due to their greater mortality from hypertensive causes other than stroke. Since, however, it thus appears probable that fatal strokes at this age are equally common in both sexes, the considerable preponderance of women should not affect the validity of the control group.

Although these figures unquestionably support the view that there is an important association between very high blood-pressure and the development of a fatal cerebral vascular accident and, in particular, have suggested that diastolic pressure of 150 mm. Hg is in this respect a critical level, it is equally plain that this is not the exclusive influence, for a third of the patients have blood-pressure consistently below this level. Searching therefore for other sign-posts, we naturally notice the frequent appearance in these cases of signs of severe renal damage, a category which does not include loss of renal concentrating power. (This is not unexpected, for this particular measure of renal impairment appears to have little prognostic importance in hypertensive disease.) It therefore seemed desirable to explore the possibility that renal damage might be an influential factor in the absence of excessively high blood-pressure by considering first the individual renal status of the 10 patients with diastolic pressures below 150 mm. Hg who died from strokes (table I).

From the table it will be seen first that 3 patients (cases 7, 9, and 10), who were exceptional in showing the features of mild and benign hypertension, had each survived a previous stroke. It seems, however, much more likely that, in these circumstances, the fatal stroke was determined by local cerebral vascular changes following infarction than that it was an expression of advanced general vascular disease. If this view is accepted, these cases should clearly constitute a category of their own. Of the remainder, cases 4, 5, and 8 were undoubtedly in renal failure when they succumbed to strokes, and the first 3 patients, each of whom retained fair renal function, showed, on the other hand, a degree of hypertension only slightly less severe than the level which has been judged rather arbitrarily to be critical. Thus there remains only 1 patient (case 6) who fails altogether to be accounted for in terms of particularly high blood-pressure or serious renal involvement. There is, however, a strong suspicion that, in his case, the fatal stroke was due to massive cerebral infarction rather than to cerebral hæmorrhage, since for several years he had been an invalid with recurring attacks of hypertensive heart-failure.

TABLE I—RENAL STATUS OF 10 PATIENTS WITH DIASTOLIC PRESSURES LESS THAN 150 MM. HG WHO DIED FROM STROKES

Case no.	Diastolic pressure (mm. Hg)	Albumin	Blood-urea	Urea-clearance	Remarks
1	149	+	Normal	Normal	..
2	146	+	Normal	Normal	..
3	144	+	Normal	Normal	..
4	140	++	88 mg. per 100 ml.	25%	..
5	139	++	Normal	40%	..
6	132	+	Normal	Normal	Recurrent heart-failure
7	130	–	Normal	Normal	Survived previous stroke
8	128	++	60 mg. per 100 ml.	30%	..
9	122	–	Normal	Normal	Survived previous stroke
10	120	–	Normal	Normal	Survived previous stroke

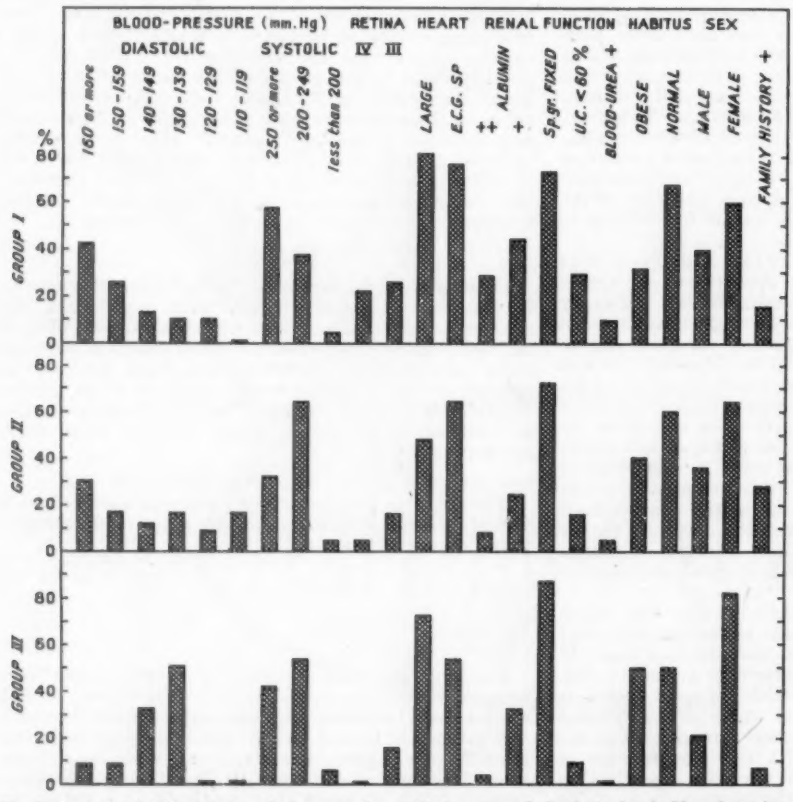

Fig. I—Analysis of clinical findings in hypertensive patients: group I, fatal strokes in 31 patients (av. age 50½); group II, 25 patients (av. age 52) who survived strokes; group III, 32 (av. age 59) who had no strokes; U.C., urea-clearance.

Nevertheless, before any weight can be attached to this concept, it must clearly be tested also in relation to the control group; for, if it were found that an appreciable proportion of these patients, who, despite very high levels of blood-pressure, escaped strokes also showed signs of substantial renal damage, this association would cease to have any significance. However, in this respect the patients in the control group (table II) have provided a satisfying contrast, because only 1 of the 11 cases with the highest diastolic pressure in the group showed at most a notable degree of albuminuria. Since this particular patient died at the age of 61 from cardiac infarction, one may perhaps speculate about the fate which otherwise might have overtaken him.

There does therefore appear to be considerable support for the belief that signs of renal damage are second in importance only to very high blood-pressure in distinguishing the hyper-

tensive patient who is in particular hazard of a fatal cerebral vascular accident.

Apart, however, from papillœdema being seen only in patients destined to die from stroke, comparison of these two groups has revealed no other distinguishing feature, and it is important to note that, in agreement with the observations of Soloff and Bello (1948), the development of retinopathy has not appeared to have particularly sinister implications.

Therefore I suggest that it is reasonable to conclude from this clinical study that (1) a fatal stroke is likely in any patient with exceptionally high blood-pressure (i.e., diastolic pressure which consistently exceeds 150 mm. Hg); (2) a fatal stroke may also occur when blood-pressure is somewhat lower than this if there is severe renal damage (i.e., an appreciable degree of albuminuria with or without decreased urea-clearance or urea retention); and (3) there is risk of a fatal stroke at any level of blood-pressure when a patient has previously survived a stroke.

TABLE II—RENAL STATUS OF 11 PATIENTS WITH DIASTOLIC PRESSURE IN EXCESS OF 140 MM. HG WHO ESCAPED STROKES

Case no.	Diastolic pressure (mm. Hg)	Albumin	Blood-urea	Urea-clearance
1	165	−	Normal	Normal
2	160	+ +	Normal	Normal
3	160	−	Normal	Normal
4	156	+	Normal	Normal
5	156	−	Normal	Normal
6	150	−	Normal	Normal
7	148	+	Normal	Normal
8	145	−	Normal	Normal
9	145	−	Normal	Normal
10	144	−	Normal	Normal
11	142	−	Normal	Normal

Comparison of Group II with Group III (fig. 1)

In contrast to the previous comparison there appears to have been remarkably little difference in the clinical character of these two groups of patients. The incidence of severe diastolic pressure (150 mm. Hg or higher) was again notably higher in group II (46% compared with 18%), but no real significance can be attached to this, because the remainder of the cases in this group were evenly distributed throughout the lower ranges of blood-pressure, and a quarter of these patients had a diastolic pressure lower than that of any of the controls. Since the highest grades of systolic pressure also were more prevalent among the controls, it must be concluded that the occurrence of this type of stroke is uninfluenced by blood-pressure.

Signs of renal damage were no more evident in group II than among the controls; nor at any other point of clinical comparison was there any real difference between these groups. However, patients who subsequently had a stroke provided a family history of such occurrences four times more often than did those who had so far escaped.

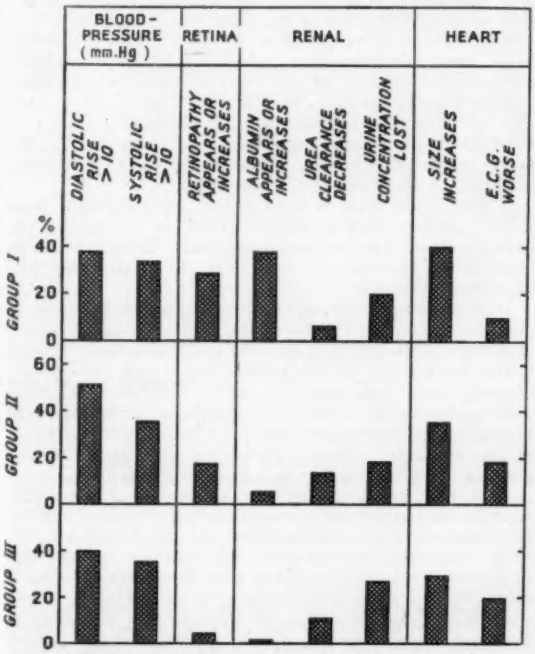

Fig. 2—Evidence of clinical deterioration during observation.

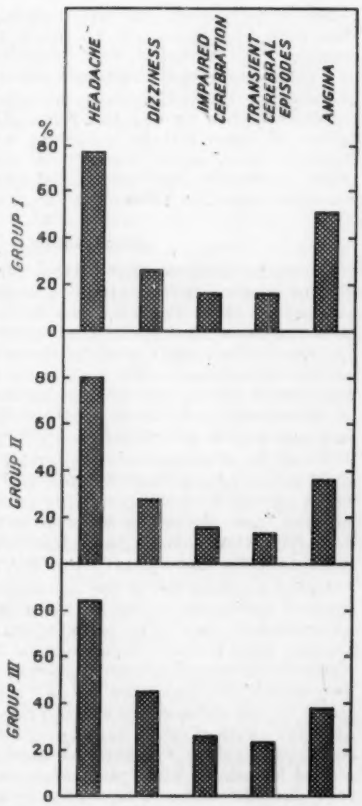

Fig. 3—Comparison of symptoms.

Thus the hypertensive patient destined for a stroke of this character appears to carry no special mark of identity, and it must be assumed that, apart from the undoubted influence of a family propensity, the risk of this is one that is evenly shared.

The possibility that patients who have strokes may have an especially progressive form of hypertensive disease was also considered. In fig. 2 the three groups of patients have been further compared as regards rise of blood-pressure and other signs of clinical deterioration during observation. This comparison, however, is inevitably of rather limited value because the frequency with which adverse features were recorded as appearing during observation was influenced by their previous prevalence in that group. Also in this instance the number of patients in the first two groups was slightly smaller than usual owing to lack of opportunity to re-examine every patient before the stroke. Nevertheless, in view of the emphasis earlier placed on this association, it is of some interest to see that patients destined to die from strokes were the only ones to show a tendency to progressive albuminuria. Retinal hæmorrhages and exudates developed rather more frequently among the patients in groups I and II, but increase in blood-pressure seemed to be uniformly distributed, and in all other respects the behaviour of the three groups differed very little.

Finally, the incidence of certain symptoms, particularly those which may be ascribed to disturbances of cerebral circulation, is recorded in fig. 3. The remarkable similarity

of the three groups in this respect makes it clear, however, that such symptoms are no guide to future cerebral disaster. In particular, the transient cerebral episode or "little stroke" so commonly regarded as sinister has occurred no more frequently among patients destined for strokes than among the remainder. Although the nature of these attacks continues to be debated, the evidence here seems scarcely to support Pickering's (1948) contention that arterial thrombosis rather than spasm is invariably their basis.

Discussion

It can be assumed that thrombosis developing in an atherosclerotic cerebral artery accounts, if not for all, at least for most strokes which have not proved fatal. It is therefore no surprise that these occurrences have appeared to be uninfluenced by the severity or character of the hypertensive disease; nor is the conclusion unexpected that it is no easier to predict the development of thrombosis in a cerebral artery than its occurrence in a coronary or peripheral limb artery.

Where fatal strokes are concerned, however, clinical analysis has proved more helpful, and the characteristics which appear to distinguish this group of hypertensive patients from the remainder were sufficiently prevalent to suggest that some pathological condition other than atherosclerosis may be involved here.

As the constant use of the non-committal term "fatal stroke" will have suggested, the cause of these strokes unfortunately can only be inferred, because necropsy appears only to have been done in 3 cases, in each of which intracerebral hæmorrhage was found. Nevertheless, except in 2 cases described as "cerebral thrombosis" and 2 further cases where this information was unobtainable, the cause of death was in every case certified by the patient's doctor as "cerebral hæmorrhage," and from the almost invariable description of rapid progressive coma there is little reason to doubt the accuracy of the certification. The great majority of such patients appear to have survived only a few hours, in no case longer than twenty-four hours, thus following closely the course reported by Rose (1948) in his account of over 200 proved cases of cerebral hæmorrhage.

Both subarachnoid hæmorrhage and massive cerebral infarction may be mistaken for intracerebral hæmorrhage. Nevertheless, on the evidence available, it seems fair to conclude that, for practical purposes, the term "fatal stroke" can here be regarded as virtually synonymous with death from intracerebral hæmorrhage.

The exact mechanism of hypertensive cerebral hæmorrhage is still largely conjectural, since objective studies have invariably been defeated by the extent of the accompanying brain damage. Apart from Scheinker (1945), who suggested that bleeding might originate in cerebral veins which had become thin-walled from long-standing congestion, it has been generally assumed that the hæmorrhage is arterial; but further than this lies difficulty, for the pathological changes of arteriosclerosis lend themselves more convincingly to explanations of thrombosis than of hæmorrhage.

This difficulty at least was avoided by Globus and Epstein (1953), who suggested that artery walls might become weakened in areas of ischæmic cerebral softening through lack of supporting brain substance, but it is nevertheless in terms of arteriosclerosis that an explanation of the hæmorrhage has usually been sought. Eros (1951), for example, drew attention to an essentially degenerative and therefore potentially vulnerable form of arteriosclerotic change affecting cerebral arteries which constitutionally had a hypoplastic elastica. Russell (1954), on the other hand, considers that the replacement of medial muscle by fibrous tissue, which she finds a characteristic of arteriosclerotic perforating cerebral arteries, adequately explains the prevalence of capsular hæmorrhages in benign hypertension.

Earlier in this review it was suggested that, in a few cases where hypertension appeared surprisingly mild and benign, cerebral hæmorrhage was probably a sequel to previous cerebral thrombosis. This sequence of events may logically be related to the development of arteriolar necrosis, which is not uncommonly seen in the marginal area of a cerebral infarct (Pickering 1955). In older hypertensives (excluded from this analysis) cerebral hæmorrhage has often appeared to develop upon this background, but below the age of 60 this has been exceptional, and the two features which consistently have distinguished these cases have been very high diastolic pressure (exceeding 150 mm. Hg) and rather lower pressure associated with signs of renal damage, both of these features being characteristic of the "accelerated" form of hypertensive disease. (The term "malignant" hypertension is traditionally reserved for such cases when papillœdema is also present.)

Only 2 of the 31 patients with cerebral hæmorrhage who provide the basis for this discussion were considered likely to have had primary renal disease; and, apart from 5 patients in whom hypertension followed pregnancy toxæmia, the remainder were all regarded as having primary hypertension. Thus, with few exceptions, any renal changes present were likely to be the consequence rather than the cause of the hypertension.

Castleman (1951), from renal biopsy during lumbo-dorsal sympathectomy, established that the degree of impairment of renal function shown by a hypertensive patient was fairly closely related to the grade of arterial change found in the kidneys, and that the latter bore an even closer relationship to the height of the diastolic pressure.

In a small but similar study of biopsy material from hypertensive cases of rather exceptional severity Heptinstall (1954) confirmed these findings. Of especial interest for this discussion is his observation that fibrinoid necrosis of renal arterioles seemed to appear with increasing frequency as the diastolic pressure exceeded 150 mm. Hg. Although it is not to be expected that in every case arteries will show a precisely similar reaction to a certain level of blood-pressure, the identity of this figure with the blood-pressure level clinically considered particularly critical in the development of cerebral hæmorrhage seems more than a coincidence. Inevitably this prompts the suggestion that fibrinoid necrosis in cerebral arterioles offers the most likely explanation for most cases of cerebral hæmorrhage in hypertensive patients, at least before the age of 60.

If this explanation is correct—on a pathological basis it has been accepted by Russell (1954) as explaining the prevalence of pontine and brain-stem hæmorrhages in malignant hypertension—it is likely to be of more than academic interest.

It is generally believed that, unlike any other form of degenerative arterial disease, fibrinoid necrosis is a direct result of excessively high arterial blood-pressure. Byrom (1954) has offered the attractive theory that necrosis is a consequence of local anoxæmia of the arteriolar wall when spasm is provoked by the stimulus of high intra-arteriolar pressure, the summated effect of innumerable foci of reflex arteriolar spasm producing the characteristic pattern of accelerated or malignant hypertension.

It is, however, now firmly established that the malignant form of hypertension is at least potentially reversible by measures which successfully, though intermittently, lower the diastolic pressure to "safe" levels. By implication this also suggests that arteriolar necrosis is reversible and even more certainly is preventable. Thus, with increasing awareness of the absolute necessity of reducing blood-pressure which approaches the critical level before irreparable kidney damage renders this

impracticable, and with anticipated improvements in the drugs which will achieve this, it does not seem too much to expect that, in the future, this particular form of cerebral vascular hazard may be largely eliminated. There is indeed already a distinct impression that cerebral hæmorrhage uncommonly causes the death of a hypertensive patient who has been treated even with partial success by either sympathectomy or ganglion-blocking drugs.

Summary

A group of 234 hypertensive patients under observation for ten years provided an opportunity for studying the clinical background of cerebral vascular accidents.

During this time 97 patients died as a consequence of hypertension; and stroke, which accounted for 41 cases, was the commonest cause of death.

The present review is concerned only with strokes which occurred before the age of 60 and is based on the study of 31 cases in which the stroke was fatal and 25 cases where it was survived. No necropsies were done, but there is reason to believe that, with very few exceptions, the fatal strokes were due to intracerebral hæmorrhage, and the non-fatal strokes mostly to cerebral thrombosis.

Since the clinical status of every patient had been fully assessed before the stroke, it was hoped that study of these cases might offer some guidance in predicting these catastrophes.

From comparison of the clinical characteristics of these cases with those of a control group of hypertensive patients who have remained free from strokes, it appears that cerebral hæmorrhage is liable to occur in any case where the diastolic pressure is excessively high (150 mm. Hg or higher) but is also likely when blood-pressure rather lower than this is accompanied by signs of severe renal damage.

Cerebral hæmorrhage, which occasionally develops as a late sequel to cerebral infarction, appears to be uninfluenced by either the severity or the character of the hypertensive condition and cannot therefore be foreseen.

The study failed to reveal any special features by which a patient destined to develop cerebral thrombosis may be identified in advance.

Cerebral symptoms were equally prevalent in the three groups of hypertensive patients studied and thus gave no indication of prognosis.

Cerebral hæmorrhage due to hypertension is not easily explained in terms of atherosclerosis, and the clinical character of the cases studied suggests that fibrinoid necrosis is likely to be mainly responsible for cerebral hæmorrhage before the age of 60.

Since fibrinoid necrosis is potentially a reversible condition and almost certainly preventable, timely and effective hypotensive treatment should substantially reduce its incidence.

REFERENCES

Byrom, F. B. (1954) *Lancet*, ii, 201.
Castleman, B. (1951) Symposium on essential hypertension. Massachusetts; pp. 110, 114.
Eros, G. (1951) *J. Neuropath.* **10**, 257.
Globus, J., Epstein, J. A. (1953) *Ibid*, **12**, 107.
Heptinstall, R. H. (1954) *Brit. Heart J.* **16**, 133.
Pickering, G. W. (1948) *J. Amer. med. Ass.* **137**, 423.
— (1955) High Blood-pressure. London.
Rose, W. M. (1948) *Lancet*, ii, 561.
Russell, D. S. (1954) *Proc. R. Soc. Med.* **47**, 689.
Scheinker, M. (1945) *Arch. Neurol. Psychiat.* **54**, 395.
Soloff, L. A., Bello, C. T. (1948) *Amer. J. med. Sci.* **215**, 660.

"... Freud came upon a world that was naively sober and earnest. Truth, it held, was truth, and fact—fact. Relationships were patent, or were to be made so.... Reality *was* reality, and neither ever was nor ever could be anything else.... Into this all-too-cock-certain world Freud threw the bombshell of symbolism. Reality, he asserted, stood not monolithically by itself, but in a series of relatednesses, and was in effect but the latest symbolic representation of that relatedness. Dreams spoke in symbols, but so also do we, waking, for words have meaning and representations, far above and behind their explicit conveyance."—Dr. I. GALDSTON. *Bull. N.Y. Acad. Med.* 1956, **32**, 908.

PAGET'S DISEASE OF BONE ASSOCIATED WITH HASHIMOTO'S STRUMA LYMPHOMATOSA

A CLUE TO THE PATHOGENESIS OF PAGET'S DISEASE?

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THIS paper describes the concomitance of Paget's disease of bone with Hashimoto's struma lymphomatosa in a group of patients. The association appears to be frequent enough to warrant a wider clinical and radiological study of both disorders, and, if confirmed, may provide a clue to the ætiology of Paget's disease. In the present series of 35 patients with Hashimoto's disease, histological examination of the thyroid gland was made in 32. Of the 3 cases not so examined, 2 showed hypothyroidism, a firm goitre, and grossly abnormal serum-flocculation reactions (Luxton and Cooke 1956), and 1 had hypothyroidism with a firm goitre. Of the 35 patients with struma lymphomatosa, clinical Paget's disease (confirmed radiologically) was present in 3, and Paget's disease was discovered radiologically in 4 others. The thyroid gland was examined histologically in all the patients with Paget's disease: all showed the features typical of Hashimoto's disease.

Case-reports

Case 1.—A woman, aged 42, presented as a case of Graves's disease and was treated for four months with average doses of methyl thiouracil. The goitre became very hard and thyroid biopsy showed Hashimoto's disease (Dr. J. Davson). An X ray of the pelvis revealed Paget's disease of bone (Dr. J. B. Fawcitt). Serum-flocculation tests, at first grossly abnormal, returned to normal twenty-three months after the start of treatment with dried thyroid gland. The serum-alkaline-phosphatase, initially normal, has gradually increased to 25 King-Armstrong units per 100 ml.

Case 2.—A euthyroid woman, aged 42, presented with a large goitre of fairly soft consistence and apparently recent in origin. Paget's disease had been discovered in her right tibia five years before (Dr. J. Blair Hartley). The serum-alkaline-phosphatase was normal but serum-flocculation tests were abnormal. The thyroid histology was that of definite but early Hashimoto's disease (Dr. Davson).

Case 3.—A woman, aged 68, had radical mastectomy for scirrhous carcinoma in 1949. In a routine follow-up chest X ray in January, 1950, the radiologist (Dr. Blair Hartley) noted Paget's disease of the right clavicle. A hard goitre was first noticed in November, 1954, its microscopic picture being that of "lymphadenoid goitre" (Dr. Helen Russell). Radiologically the right clavicle showed no alteration during a period of five years and nine months. The patient had not had endocrine treatment for secondary carcinomatosis and there is no reasonable doubt about the diagnosis of Paget's disease.

Case 4.—A woman, aged 78, had a goitre of twelve months' duration which clinically appeared to be malignant, but which, on microscopy, showed Hashimoto's disease (Dr. Russell). Clinically there were no bone lesions, but X rays showed well marked Paget's disease in pelvis and skull (Dr. Fawcitt). Abnormalities were present in the serum-proteins, shown by electrophoresis and flocculation tests.

Case 5.—A woman, aged 55, first noticed a goitre in 1946 which was removed nine months later, its histology being typical of Hashimoto's disease (Dr. Russell). In 1955 clinical examination showed mild hypothyroidism and Paget's disease of the right tibia. The serum-flocculation tests were negative. Radiologically Paget's disease was found in other bones (Dr. Fawcitt) and the diagnosis was confirmed by bone biopsy (Dr. Davson).

Case 6.—A woman, aged 69, had a hemithyroidectomy for a goitre which histologically showed Hashimoto's disease (Dr. Russell). Subsequently she was treated with dried thyroid

gland. Five years later the patient was euthyroid and the serum-flocculation tests and serum-protein electrophoretic pattern were normal. Radiographs of the skull showed advanced Paget's disease (Dr. Blair Hartley).

Case 7.—A woman, aged 48, had a small firm diffuse goitre, hypothyroidism, and abnormal flocculation tests. Histologically, the goitre showed Hashimoto's disease (Dr. Davson). For the previous four years she had had clinical and radiological signs of what was thought to be polyostotic fibrous dysplasia affecting the left tibia, right great trochanter, and one metacarpal. A second biopsy of the tibia revealed histologically that the bone lesion was, undoubtedly, Paget's disease (Dr. Davson).

Biochemical Features

In 5 of the 7 cases existing plasma-protein disturbance was revealed by abnormal serum-flocculation tests or by serum-electrophoresis. (Similar changes in serum-proteins had probably been present in the remaining 2 patients before treatment of the thyroid disorder, the one by partial thyroidectomy and the other by dried thyroid gland [Luxton and Cooke 1956, Roitt et al. 1956].) The serum-alkaline-phosphatase was within the normal range in 1 case, slightly raised (11–15 K.-A. units per 100 ml.) in 2 cases, and persistently high in 4 cases. Serum-calcium and inorganic-phosphate levels were normal in the 6 cases examined.

Discussion

Prevalence of Paget's Disease

The prevalence of Paget's disease in the general population may be assessed by necropsy studies and by radiological field surveys. Schmorl (1932), performing 4614 necropsies on unselected persons aged over 40, found 138 with Paget's disease—a rate of 3%. A recent necropsy study, comparable in its method, was made by Collins (1956) who examined in detail the skeleton of 650 unselected persons aged over 40 who died in general hospitals in Leeds and Sheffield. Paget's disease was found in 24 of these cases—a rate of 3·7%. Collins states that "this study was mainly concerned with the recognition of minor, localised or early lesions" and "regeneration of bone in Paget's disease always leads to an abnormal trabecular pattern, as easily recognised by the pathologist in the sawn bone as by the radiologist in the living skeleton." He observes that only a third of all cases of Paget's disease are diagnosable clinically, and that the disease is commoner in men than in women, probably in the proportion of four men to three women. The prevalence figures are greatly influenced by age. Collins divided his cases into 15-year groups and found Paget's disease in 1·8% of persons aged between 40 and 54 years, 3·6% between 55 and 69 years, 5% between 70 and 84 years, and 9·1% between 85 and 94 years.

Paget's disease of bone is a fairly common incidental finding in radiological examinations. To obtain accurate figures of its incidence, radiological surveys of the general population would need to cover the whole skeleton of each individual, for the disease may be localised to a single bone or part of one bone. So far as I can ascertain, no extensive field survey of this nature has been made. However, Kellgren and Lawrence (personal communication) in a study in Leigh, Lancashire, made radiological examinations of 173 unselected men in the decade 55–64 years and found 8 cases of Paget's disease (4½%), and of 208 women in the same age-group of whom 1 showed Paget's disease (½%)—an over-all incidence in both sexes of 2·4%. The X-ray examination in each person was limited to the cervical spine, lumbar spine, pelvis, knees, hands, feet, and lateral aspect of the skull (partial). In all such studies, the criteria for making a radiological or histological diagnosis must vary slightly from one examiner to another and the factor of "observer error" must always be remembered.

It is probable that the prevalence-rate of Paget's disease found by Schmorl and by Collins is reasonably accurate. For assessing the presence of Paget's disease, Collins's method of examination of the skeleton would seem comparable in accuracy with the limited radiological bone survey made in the patients with struma lymphomatosa. Lacking precise radiological studies of the incidence of Paget's disease in the general population, I have therefore taken Collins's figures as a basis. The rising prevalence of Paget's disease with increasing age is, of course, important statistically.

TABLE I—DISTRIBUTION IN AGE-GROUPS OF PAGET'S DISEASE AND HASHIMOTO'S DISEASE

—	Age-group (years)		
	40–54	55–69	70–84
Collins's figure of prevalence of Paget's disease in the general population	1·8%	3·6%	5·0%
No. of cases of Hashimoto's disease	17	14	4
No. of cases of Hashimoto's disease with Paget's disease associated	3	2	2

Statistical Evaluation of Present Group of Patients

Table I shows the numbers of cases of Hashimoto's disease and of Paget's disease in the different age-groups, alongside Collins's estimation of the incidence of Paget's disease in the general population. Statistically the following may be deduced:

1. The higher proportion of patients with Paget's disease in the whole group of 35 patients with Hashimoto's disease is statistically highly significant. ($P=0·0004$ when tested by χ^2 with Yates's correction.)

2. Although the actual number of cases of Paget's disease is small and breakdown into age-groups makes the individual statistical values less significant, tests on this basis give the following results:

40–54 age-group: $0·006 < P < 0·005$
55–69 ,, ,, $P = 0·2$
70–84 ,, ,, $P = 0·01$

In calculating figures for the purpose of applying statistical tests of significance, corrections have been incorporated to allow for two features which would otherwise introduce bias.

(*a*) All the patients with Paget's disease in this series are women. In the 1951 census population of North-West England, which has been used for providing denominators, 55% in the age-group 40–84 are women, whilst in the individual age-groups enumerated above, the proportions of women are 52%, 57%, and 61% respectively.

TABLE II—TIME RELATIONS BETWEEN PAGETS DISEASE AND GOITRE

Case	Age (years) when Paget's disease first diagnosed	Time-relations between diagnosis of Paget's disease and discovery of goitre	Thyroid activity before thyroid operation
1	43	Goitre 18 months before Paget's disease	Hyperthyroid
2	37	Paget's disease 5 years before goitre	Euthyroid
3	69	Paget's disease 58 months before goitre	?
4	79	Goitre 18 months before Paget's disease	?
5	64	Goitre 9 years before Paget's disease	?
6	74	Goitre 5 years before Paget's disease	?
7	45	Paget's disease 46 months before goitre	Hypothyroid

(*b*) The prevalence of Paget's disease in the general population is in the ratio of 4 men to 3 women.

Relationship between Hashimoto's Disease and Paget's Disease

Hyperthyroidism and hypothyroidism do not appear to be factors in the genesis of Paget's disease. Of the patients with Paget's disease in this series, 1 was originally hyperthyroid, 1 euthyroid, and 1 hypothyroid. (Pre-operative observations on the state of thyroid activity were inadequate in 4 patients, neoplastic goitre being suspected.)

There are three main ways in which an association between struma lymphomatosa and Paget's disease could arise: struma lymphomatosa may predispose to Paget's disease, Paget's disease may predispose to struma lymphomatosa, or there could be a predisposing factor common to both diseases. Table II shows the time-relations between the discovery of Paget's disease and the first observation of the goitre in this group of patients. It must be emphasised that in a slowly evolving disease such as Paget's, the actual time of onset is hard to assess even in terms of years. A similar comment applies to struma lymphomatosa, for not only may the disease antedate the goitre, but the goitre may long remain undiscovered. Table II indicates that in 4 cases an observed goitre preceded the discovery of Paget's disease by periods up to nine years, and in 3 cases known Paget's disease preceded discovery of the goitre by periods up to five years. For what these figures are worth, they do not support the suggestion that either disease predisposes to the other.

Summary

Of 35 patients with Hashimoto's struma lymphomatosa, 3 patients showed clinical signs of Paget's disease of bone. A radiological bone survey of the 35 patients, limited in most cases to skull, lumbar spine, pelvis and upper femora, and one tibia, revealed that 7 out of the 35 patients had Paget's disease. The diagnosis was confirmed by bone biopsy in 2 patients.

Accurate assessment of the prevalence of Paget's disease in the general population has been attempted by others from careful necropsy examination on large series of unselected persons, and to a lesser extent, by radiological field surveys. It is considered that such necropsy studies give figures of incidence of Paget's disease in the general population comparable in accuracy with the limited radiological bone survey made in the 35 cases of struma lymphomatosa.

Statistical analysis shows that the prevalence-rate of Paget's disease in this series of patients with struma lymphomatosa is highly significant.

The pathogenesis of Paget's disease seems to be unrelated to hyperthyroidism or to hypothyroidism.

The evidence available suggests that Paget's disease does not predispose to Hashimoto's disease, nor does Hashimoto's disease predispose to Paget's disease. There may be some predisposing factor common to both disorders.

I am indebted to several pathologists and their staffs—to Dr. Helen Russell of the Christie Hospital and Holt Radium Institute, to Dr. James Davson and Mr. H. V. Street of Crumpsall Hospital, and to Dr. Lois Stent and Mr. David Moss of Withington Hospital. The radiological bone surveys were made by Dr. J. Blair Hartley (at the Christie Hospital) and Dr. J. B. Fawcitt and Dr. J. Cowen (at Crumpsall Hospital). Medical and surgical colleagues at Crumpsall Hospital and the Christie Hospital and Holt Radium Institute have been most helpful. For expert statistical help I thank Miss Marion H. Russell of the Christie Hospital and Holt Radium Institute. Prof. J. H. Kellgren and Dr. J. S. Lawrence kindly allowed me to quote their unpublished field studies. I am especially grateful to Professor Kellgren and to Prof. S. L. Baker for their interest and advice.

References at foot of next column

A METHOD OF HYPOTHERMIA FOR OPEN HEART SURGERY

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THE value of hypothermia during open heart surgery is now well recognised. The pioneer work of Bigelow in Toronto has paved the way for the use of hypothermic techniques in both cardiovascular surgery and neurosurgery. He showed (Bigelow et al. 1950a, b, and c) that the reduction in oxygen consumption that accompanies a fall in body-temperature would permit the safe interruption of circulation to vital tissues for far longer than at normal temperatures. Recent reports (Stone et al. 1956) show that oxygen consumption in the human brain is reduced by two-thirds at 30°C and by three-quarters at 28°C. A reduction of body-temperature to these levels can be expected to give an operating-time of ten minutes within the open heart without cerebral damage.

Two main methods of inducing hypothermia are currently in use—extracorporeal cooling of the blood-stream and surface cooling of the body. Extracorporeal cooling of the blood (Delorme 1953, Ross 1954) has the advantage that it can be initiated after surgery has begun and the exact nature of the lesion has been determined; but it has the disadvantage of complexity, of causing considerable biochemical disturbances (Brewin et al. 1956), and of provoking cardiac irregularities more often (Graham 1955). Surface cooling has as its great merits simplicity and lack of gross physiological disturbance.

I describe here the method of surface cooling used for open heart surgery at the Middlesex Hospital. So far 32 patients have been subjected to open cardiac surgery: 26 for the repair of atrial septal defects and 6 for the relief of pulmonary stenosis. There have been no deaths and few complications.

We have followed closely the method developed by Swan et al. (1955) at the University of Colorado School of Medicine, and it is a pleasure to acknowledge their valuable help and guidance during a visit to Denver. We have modified their technique as regards temperature level and rapid surface rewarming. This rewarming, together with close surgical coöperation and effective "dovetailing" of the several stages of the procedure, has reduced to three hours the time from induction of anæsthesia to the return of the rewarmed patient to the ward. The time factor is of some importance in view of the number of cases awaiting surgery and the need to avoid disruption of ward and operating-theatre routine.

Ours has been a team project and I am indebted to my surgical, cardiological, and anæsthetist colleagues and to theatre, ward, and technical staff, who have all contributed to making the method practical. The salient features of this method are:

(1) Minimal anæsthesia using ether and muscle relaxants.
(2) Surface cooling by blanket and cold bath.
(3) A deep-tissue temperature of 30°C during circulatory arrest.
(4) Immediate rapid surface rewarming by blanket during surgery and by warm bath subsequently.

These features are well illustrated in the chart (fig. 1) of the operation for an atrial septal defect in a child of 6 years.

DR. LUXTON: REFERENCES

Collins, D. H. (1956) *Lancet*, ii, 51.
Luxton, R. W., Cooke, R. T. (1956) *Ibid*, p. 105.
Schmori, G. (1932) *Virchows Arch.* **283**, 694.
Roitt, I. M., Doniach, D., Campbell, P. N., Vaughan Hudson, R. (1956) *Lancet*, ii, 820.

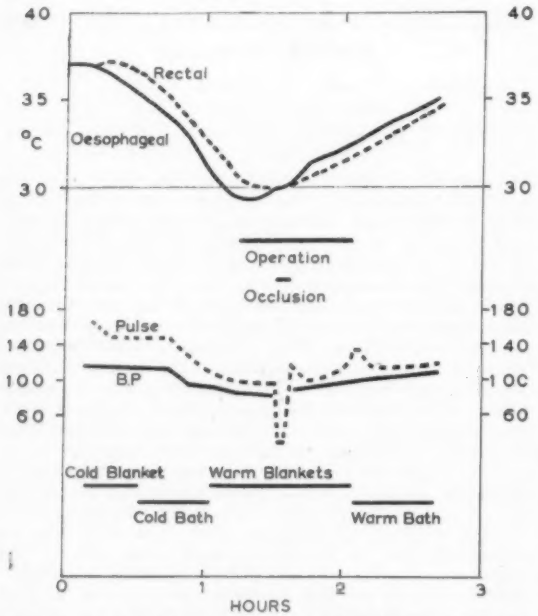

Fig. 1—Repair of atrial septum under hypothermia in a child aged 6 years and weighing 40 lb.

The Method

Anæsthesia

An hour after premedication with promethazine, pethidine, and scopolamine, anæsthesia is induced with thiopentone. This is immediately followed by administration of succinylcholine and by oral intubation. Anæsthesia is continued with nitrous oxide, oxygen, and ether. Tubocurarine ('Tubarine') is given to secure complete relaxation, and respiration is controlled throughout the entire procedure.

Ether is used because it is less irritant to the cooling myocardium than are many other anæsthetic agents. It causes vasodilatation and thus assists heat exchange. When the patient has been cooled to the required temperature, ether is discontinued and most of what remains in the body is removed by vigorous ventilation. This ensures that during the period of circulatory arrest the tissues—particularly the brain—are as free as possible from drugs. During the operation anæsthesia is maintained by a sum of the depressant effects of hypothermia and its potentiation of the residue of the drugs not yet eliminated—the so-called "hypothermic anæsthesia" (Virtue 1955).

Cooling

As soon as induction of anæsthesia is completed, the patient is placed between plastic blankets through which water at 15°C is circulated. Electric thermometers are placed in the œsophagus (to the level of the nipple line), in the nasopharynx, and in the rectum. Intravenous drips are set up, and electrocardiographic leads and a blood-pressure cuff are attached to the patient. During this time some superficial cooling takes place, which helps to shorten the procedure.

When these preliminaries are completed, the patient is immersed in a bath of water at 15–17°C, and shortly afterwards ice is added to keep the temperature of the water between 8°C and 10°C throughout the rest of the cooling.

The gradual introduction to the cold environment is deliberate, so that the temperature of the venous blood returning to the heart shall not drop suddenly. Immersion of a patient with dilated vessels in freezing water might well precipitate ventricular fibrillation. It was the ease with which this catastrophe could occur in venovenous cooling in dogs that caused us to abandon this method in the experimental stages, when it was found that the temperature of the myocardium could rapidly become 6°C or even 10°C cooler than the other tissues of the body.

In the bath the patient's head and hands are supported above water. After twenty minutes the toes are also lifted out to prevent undue chilling of the digits. A towel soaked in cold water is placed over the patient so that the chest and knees, which tend to float above water, are effectively cooled and the maximum surface area is offered for heat exchange. This towel also serves to satisfy those who criticise the method on æsthetic grounds. The water is repeatedly stirred, and the superficial tissues of the patient are frequently massaged and kneaded to prevent stagnation of cold blood and to speed up heat exchange. When the temperature of the bath water is maintained at about 10°C, there is no undue venospasm and circulation to the periphery remains reasonably good; thus heat exchange keeps pace with the superficial cooling, and no large volume of cold superficial tissues is built up which might cause a profound drop in temperature after the patient has been removed from the bath.

Temperatures are recorded every five minutes, and after a lag of from five to fifteen minutes they are found to fall progressively, the rate of descent depending on the relations of surface area to body-weight. Should the fall become retarded, or the patient shiver or develop excessive goose pimples, further ether and tubarine are given to overcome the body's attempts to increase heat production.

As the body-temperature drops so does the heart-rate, and by the time the operation is in progress it may be as low as 35–40 a minute. The systolic blood-pressure, which is low immediately after induction, rises on immersion in the bath, as a result of vasoconstriction; but it falls later to 80–90 mm. Hg and remains at this level, except during circulatory arrest, until it rises again on completion of rewarming. The radial pulse is palpable without difficulty during cooling. Another sign of cooling is the gradual increase in the size of the pupils, which become widely dilated at temperatures below 30°C. As cooling progresses, a distinctive pink coloration of the immersed skin is seen: it is thought to be due to a combination of capillary stasis or paralysis and reduced metabolism in the skin. The patient is removed from the bath when the œsophageal temperature reaches 31°C in children or 32°C in adults. The time in the bath varies from about thirty minutes in a child weighing 40 lb. to seventy minutes in a plump woman weighing 120 lb.

Immediate Rewarming

The patient is removed from the bath, dried, and placed between plastic blankets through which water at a temperature of 40°C is now circulating. The chest is exposed, and the arms are abducted to 90° and placed on arm-rests angled upwards slightly to prevent drag on the brachial plexus.

After-drop

With hypothermia induced as thus described the after-drop or drift in œsophageal temperature is about 2°C in adults and 1½°C in children. This drift takes place despite immediate rewarming with water blankets at 40°C. The drift in nasopharyngeal temperature is usually 1°C more; but, as there is a lag of 1°C in the nasopharyngeal behind the œsophageal temperature, equilibrium is reached at or just below 30°C. The after-drop reaches its maximum in about twenty-five minutes in children and forty minutes in adults.

Operation

Ether is discontinued when the patient is removed from the bath. Nitrous oxide is discontinued when the

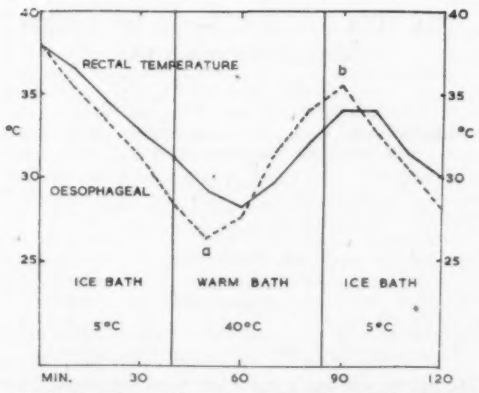

Fig. 2—Experimental hypothermia in a dog weighing 34 lb.

incision is made, and vigorous controlled respiration is maintained with pure oxygen until after the period of circulatory arrest. This rapidly eliminates ether and allows diathermy to be used throughout the operation. Blood is given to replace that lost during exposure of the heart through the bilateral anterior incision, and an attempt is made to reach optimum circulatory and respiratory conditions immediately before circulation is arrested. Tourniquets are placed round the venæ cavæ, and a clamp is placed through the transverse sinus ready to occlude the aorta and the pulmonary artery. The incision is made into the heart with a controlling clamp in place so that no unnecessary manœuvre should waste valuable seconds during the period of occlusion.

After occlusion of the venæ cavæ, from ten to fifteen seconds is allowed for the heart to empty, when neostigmine 0·03 mg. per stone of body-weight is injected proximal to the aortic clamp (Prevedel et al. 1954, Sellick 1955). This reaches the coronary circulation and almost immediately slows the heart. The controlling clamp is removed, the heart is opened, residual blood is aspirated, and the defect is repaired under direct vision. During the period of circulatory arrest the lungs are kept gently inflated so that time is not lost in reinflating them when the circulation is restarted. At the completion of closure of an atrial septal defect an increase in pressure on the bag inflating the lungs drives remaining blood from the lung into the left atrium, excludes air, and demonstrates the satisfactory closure of the defect.

The Time of Circulatory Arrest

The period of occlusion that can safely be tolerated by the brain and myocardium at 30°C is about ten minutes. Few of our cases have taken longer than eight minutes. The average has been five and a half minutes.

In one case, in a man aged 26, after an occlusion of seven and a half minutes, a tear was found in the inferior vena cava, and an immediate reocclusion of four minutes was needed to repair it. Later in the operation a third occlusion, of two and a half minutes, was required to correct the venous return from the inferior vena cava into the right atrium. This man showed no delay in recovering consciousness and no evidence of any cerebral damage and made an uneventful recovery.

Subsequent Rewarming

After restoration of the circulation the blanket temperature is raised to 43°C; and, when a rising temperature shows that rewarming of the deep tissues has begun, 50% nitrous oxide is added to the oxygen. When surgery is complete, a watertight dressing is applied to the wound, and the patient is returned to the bath and immersed at a temperature of 40°C. By this time some rewarming has taken place from the water blankets. In children the temperature may have reached 32°C and in adults 31°C by the completion of the surgery. The warm bath is maintained at 40°C, and the same stirring and kneading technique is used as during the cooling. The patient remains in the bath until an œsophageal temperature of 35°C is reached. Spontaneous respiration is re-established, and residual curare is counteracted with atropine and neostigmine.

After-rise

A phenomenon similar to the after-drop occurs when the patient is removed from the warm bath and an after-rise in temperature is seen (fig. 2, b). This after-rise is usually of the same order as the after-drop, and within an hour of return to the ward the patient is at normal temperature. Consciousness is regained within an hour of removal from the bath. As rewarming takes place, the size of the pupils returns to normal and is a good indication of the return of normothermic cerebral activity.

Postoperative Care

The patient goes back to the ward with an oxygen mask and is then placed in an oxygen tent and nursed flat for eight hours. Gentle suction is applied continuously to the thoracic drains to prevent pneumothorax. After eight hours the patient is helped to sit up, by stages, and is taken out of the oxygen tent. Methadone is used as an analgesic, and physiotherapy is begun as soon as possible.

Results

In 32 cases open cardiotomy has been performed with circulatory arrest using this method of hypothermia. 26 of the operations have been for the repair of an atrial septal defect (1 of these having an associated pulmonary valvular stenosis which was also corrected under direct vision at the same time, and 1 an associated mitral stenosis which was split digitally via the atrial defect); and 6 have been for the division of pulmonary stenosis (1 of these had a preoperative hæmoglobin of 188%).

Complications

There were no deaths. During the operation auricular fibrillation and flutter often occurred when the body-temperature was at or below 30°C, but normal rhythm returned on rewarming. Only 1 patient developed ventricular fibrillation; this happened at the onset of manipulation of the heart and coincided with a sudden change in pH due to replacement of a faulty soda-lime canister in the anæsthetic circuit. One shock from the electric defibrillator restored normal rhythm, and no further dangerous arrhythmia was observed. There were no complications during cooling or during rewarming in the bath.

After operation 2 patients developed pneumothorax despite intrathoracic drains. One patient had a transient hemiplegia twelve hours after operation and a phlebothrombosis of the leg: it was found later that his inferior vena cava drained partly into his left atrium, which probably explains his systemic embolism. 2 patients sustained trivial superficial burns, both due to overheating in the rewarming blanket before a satisfactory thermostatic control was fitted.

Discussion

Hypothermia is not a physiological condition, and our aim has been to keep its duration and depth to the minimum compatible with the proposed length of circulatory arrest. Cooling in the bath is by far the most efficient means of heat exchange because the greatest possible surface area is exposed to the cooling medium. On the other hand, excessively cold water, though possibly it cools the body more rapidly, produces vasospasm which delays transference of heat from the deep to the superficial tissues, with the result that a large volume of cold tissue is built up and the temperature may later fall unpredictably and often profoundly.

Immediate surface rewarming made little difference to the degree of after-drop in temperature after removal

from the bath (fig. 2, a), but it significantly shortened the hypothermia. With skilled surgical coöperation it is possible to manipulate the heart during the period of maximum cooling of deep tissues—i.e., at the lowest part of the curve (fig. 1). The bilateral thoracotomy exposure of the front of the heart and the placing of tourniquets round the venæ cavæ are surprisingly speedy, and often the tourniquets have been in position before the lowest temperature was reached.

Surface rewarming from deep hypothermia is said to be dangerous (Bigelow et al. 1952); but our experience—after being disappointed with diathermy rewarming in the earlier cases—has been that rapid surface rewarming from 28°C does nothing but good, and we have seen no cardiovascular disturbances during it.

Œsophageal temperatures have been taken as the criterion of the deep-tissue temperatures. The rectal temperatures were very unreliable and could indeed be dangerous if taken alone; for the lag that occurs if the rectal thermometer is insulated by fæces may well lead to excessive cooling. In later cases nasopharyngeal temperatures were also recorded: these followed more closely the œsophageal temperatures and can probably be taken as representing the temperature of the brain (Lucas 1956).

We think it unnecessary to lower the temperature below 30°C to provide a period of five to ten minutes' circulatory arrest. At this temperature the risk of ventricular fibrillation is very slight, even in grossly enlarged hearts. When hypothermia was first used, its dangers were undoubtedly magnified because temperatures as low as 26°C were considered necessary.

Summary

A method of hypothermia for open heart surgery is described and discussed. Its salient features are minimal anæsthesia using ether and relaxants; surface cooling by blanket and cold bath; deep-tissue temperature of 30°C during circulatory arrest; and immediate surface rewarming by blanket during operation and by warm bath subsequently

The results of 32 cases without mortality are reported.

The integration of the effects of hypothermia and anæsthetic drugs make it convenient for the anæsthetist to be in over-all control of surface hypothermia and to report on the method used; but successful major cardiac surgery is the result of the work of a team which includes members from almost all departments of a large hospital.

The method of hypothermic anæsthesia used at the Middlesex Hospital has been developed for open cardiac surgery in particular for the closure of atrial septal defects. This project has involved close coöperation between cardiologists, surgeons, and anæsthetists.

I am therefore particularly indebted to Dr. D. Evan Bedford and Mr. T. Holmes Sellors for their help and advice, and also to many other members of the team—surgical, medical, nursing, physiotherapy, and technical. Facilities for experimental work on hypothermia were given me by the Institute of Clinical Research of the Middlesex Hospital.

REFERENCES

Bigelow, W. G., Callaghan, J. C., Hopps, J. A. (1950a) *Ann. Surg.* **132**, 531.
— Hopps, J. A., Callaghan, J. C. (1952) *Canad. J. med. Sci.* **30**, 185.
— Lindsay, W. K., Greenwood, W. F. (1950b) *Ann. Surg.* **132**, 849.
— — Harrison, R. C., Gordon, R. A., Greenwood, W. F. (1950c) *Amer. J. Physiol.* **160**, 125.
Brewin, E. G., Nashat, F. S., Neil, E. (1956) *Brit. J. Anæsth.* **28**, 2.
Delorme, E. J. (1953) *Lancet*, ii, 1207.
Graham, G. R. (1955) *Brit. Heart J.* **17**, 577.
Lucas, B. G. B. (1956) *Proc. R. Soc. Med.* **49**, 345.
Prevedel, A. E., Montgomery, V., Swan, H. (1954) *Proc. Soc. exp. Biol., N.Y.* **85**, 596.
Ross, D. N. (1954) *Lancet*, i, 1108.
Selitck, B. A. (1955) *Proc. World Congr.* p. 58.
Stone, H. H., Donnelly, C., Frobese, A. S. (1956) *Surg. Gynec. Obstet.* **103**, 313.
Swan, H., Virtue, R. W., Blount, S. G. jun., Kircher, L. T. jun. [illegible] (1955) *Ann. Surg.* **142**, 382.
Virtue, R. W. (1955) Hypothermic Anesthesia. Springfield, Ill.

THE HEAT RESISTANCE OF DRIED SMALLPOX VACCINE

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DURING recent years there has been increasing interest in the development of stable dried smallpox vaccines in which the living virus could be preserved for long periods at tropical temperatures. Glycerinated vaccine lymph deteriorates rapidly at room-temperature and this has always been a major difficulty in the control of smallpox in hot countries with poor transport facilities and inadequate refrigeration. A stable dry vaccine could, moreover, be stored with confidence as a reserve and thus ensure adequate supplies during an epidemic when immediate mass vaccination was essential. The ability to preserve virus preparations of known potency in a dry state would also make it possible to maintain standards for international use and facilitate the comparison of strains of vaccinia virus from different countries.

This increasing interest is reflected in the extensive laboratory and field trials of dried smallpox vaccine produced in several countries that have been carried out under the auspices of the World Health Organisation. The results of these trials (1957) have shown that dried vaccines are available which are much more resistant to heat than any glycerinated vaccine lymph.

The combined laboratory and field trials on the dried smallpox vaccine prepared at the Lister Institute have been continued over a longer period. Since this advance in vaccine production is of great importance to those responsible for vaccination campaigns in hot climates, a summary of the results obtained in these trials is presented here.

Materials and Methods

Preparation of Vaccine

This has been fully described by Collier (1955). Briefly, the vaccine consists of a suspension of vaccinia virus, partially purified by differential centrifugation and by exposure to phenol, in a solution of 5% peptone in distilled water. The suspension is dried in a centrifugal freeze-drier and sealed under vacuum in phials of neutral glass. These are dispensed together with the required amounts of reconstituting fluid in 25-dose and 100-dose outfits. Because of the small amounts of dried material and the very small amounts of reconstituting fluid required, it is not practicable to issue this vaccine in single-dose tubes.

The dried vaccine is of much greater purity than ordinary vaccine lymph; it is free from contaminating bacteria and tissue debris and in consequence produces less local secondary reaction. Storage tests have shown that the virus is better preserved when sealed under vacuum than in nitrogen, even when precautions are taken to remove traces of moisture and oxygen from this gas. The reconstituting fluid is 40% glycerol in McIlvaine buffer at pH 7·2. This is supplied in phials designed to obviate the need for sterilised syringes in transferring the fluid to the dried vaccine. The risk of contamination is thus reduced.

Storage of Vaccine

Samples of the dried vaccine were stored at −10°C, +37°C, and 45°C. A batch of glycerinated vaccine lymph was also maintained at −10°C throughout the experiment to control the susceptibility to vaccination of the rabbits used in potency titrations and of the people on whom the vaccine samples were tested.

Samples of the vaccine stored at −10°C were tested at the beginning and end of the trial. Samples stored at 37°C and 45°C were removed at intervals from 4 weeks to 106 weeks (approximately 2 years) for titration in the laboratory and trials in primary vaccination in man. Samples are still being maintained at the higher temperatures to detect any future deterioration.

In addition, samples from some other batches of vaccine selected at random were stored at 37°C and 45°C for 8 weeks and then tested in the same way to ensure that the batch used in the trial was not exceptional in its resistance to heat.

Titration of Stored Samples

All potency titrations were duplicated in the department of bacteriology of the University of Liverpool and in the Lister Institute, Elstree. At the start of the trial, titrations were done on the dried vaccine and the glycerinated lymph held at −10°C and subsequently on the dried vaccine stored at 37°C and 45°C. Thus each sample was titrated in the laboratory at the time of issue for clinical trial. Finally, at the end of the trial, samples of the dried vaccine and the control lymph held at −10°C were again titrated to ensure that there had been no deterioration at that temperature.

Titrations by scarification in rabbit skin.—These were duplicated on the clipped backs of two rabbits in each laboratory. Dilutions of vaccines were made in McIlvaine buffer, 0·01 M phosphate at pH 7·4. Volumes of 0·1 ml. of the appropriate dilution were spread over areas of about 5 sq. cm., and the skin was lightly scarified through the fluid. Threefold dilutions from 1 : 1000 to 1 : 27,000 were tested, and the glycerinated lymph was titrated on each rabbit to control its susceptibility to vaccinia virus. The lesions were recorded on the 5th and, if necessary, 6th days.

Titrations on chick chorio-allantoic membrane.—The technique of this test has been described in detail in the report on the W.H.O. trials in the *Bulletin of the World Health Organisation* (1957). Here it is only necessary to state that 0·1 ml. amounts of the appropriate dilutions of vaccine were inoculated on the dropped chorio-allantoic membranes of groups of five or six 12-day chick embryos for every dilution tested. After 48 hours' incubation at 35°C the dropped areas of the membranes were removed and washed, and the lesions were counted. Titres were expressed as infectious units per ml. of undiluted vaccine (i.u. per ml.) and were computed from the mean pock count at the lowest dilution giving discrete countable pocks.

Vaccinations

Thanks to the coöperation of the directorate of hygiene and research of the Royal Air Force and of the Headquarters Technical Training Command, in particular of the Principal Medical Officer there, Air Commodore J. Hill, sufficient volunteers were available for vaccination.

Young men with no history of previous vaccination and without scars on their arms were selected for vaccination with the samples under test. In the first instance groups of men were vaccinated with the dried vaccine and with the glycerinated lymph held at −10°C to ensure that both vaccines produced 100% of successes. Thereafter the dried vaccines stored at 37°C and 45°C were each tested in groups of about a hundred men up to 78 weeks' storage. The size of the control group vaccinated with lymph was reduced to about fifty after the earlier tests, and, in view of the successful results already obtained, the size of the groups tested with dried vaccines at 106 weeks was also reduced to about eighty.

All the vaccinations were made by one of us (R. M. C.) by a uniform technique—a single linear scratch 1/4 inch long. Arms were inspected on the 7th day and the results recorded as "vesiculation" or "no vesiculation." No other distinction was made.

Results

Resistance at 37°C and 45°C

The results of the laboratory titrations and of the vaccinations after storage for 32, 64, and 106 weeks are shown in the accompanying table. Samples were in fact withdrawn for test after storage for 4, 8, 16, 32, and 78 weeks; but, in view of the uniformly satisfactory results obtained at the later tests, it is unnecessary to include all the earlier ones in the table.

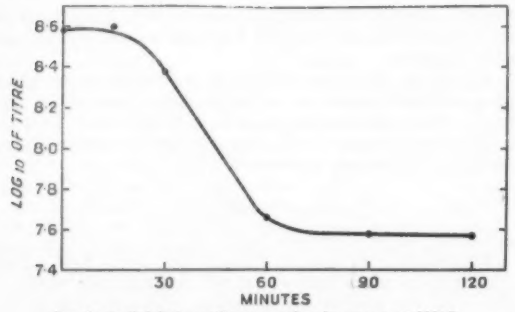
It will be seen that there was no detectable deterioration either by pock counting or scarification tests after 32 weeks' storage at 37°C and 45°C. Vaccination with these samples also produced 100% of successes. After 64 weeks' storage there was no detectable deterioration by pock counting in the sample stored at 37°C, though there might have been a slight decrease in the potency measured on the rabbit. The sample stored at 45°C showed a slight but possibly significant decrease in potency by both pock counting and rabbit titration. Both samples still produced 100% of successful vaccinations.

After 2 years (106 weeks) there was still no detectable decrease in the pock count of the sample stored at 37°C, though there was some apparent decrease in the potency measured in rabbits. The sample stored at 45°C showed a slight further decrease in pock count measured in one laboratory but not in the other. The samples stored at both temperatures still produced 100% of successful

STORAGE OF DRIED SMALLPOX VACCINE

Period of storage (weeks)	Where titrated	Titre on chorio-allantoic membrane (i.u. per ml.)	Rabbit-scarification titre 1/1000	1/3000	1/9000	1/27,000	No. of men vaccinated	Vaccination success-rate (% successful)
At −°10C								
	A	3·5 × 10⁸	c	c	c	sc +	50	100
			c	c	c	sc +		
	B	4·9 × 10⁸	c	c	sc	3		
			c	sc	sc	4		
At 37°C								
32	A	3·6 × 10⁸	c	sc +	sc +	1	109	100
			c	c	sc +	1		
	B	1·8 × 10⁸	c	c	sc +	8		
			c	c	sc	7		
64	A	2·5 × 10⁸	sc +	sc −	9	3	100	100
			c	c	sc −	6		
	B	3·8 × 10⁸	c	c	9	2		
106	A	1·8 × 10⁸	c	c	sc +	sc −	88	100
			c	sc +	sc	4		
	B	1·8 × 10⁸	c	sc	8	4		
			sc	sc	2	4		
At 45°C								
32	A	1·8 × 10⁸	c	c	sc +	7	114	100
			c	c	sc +	0		
	B	1·3 × 10⁸	c	c	sc −	3		
			c	c	sc	8		
64	A	1·1 × 10⁸	sc +	sc −	5	1	100	100
			c	sc +	sc	3		
	B	1·8 × 10⁸	c	c	5	2		
106	A	3·4 × 10⁸	c	sc +	6	0	87	100
			c	sc +	3	1		
	B	1·8 × 10⁸	c	c	8	12		
			c	sc	1	1		

i.u. per ml. = infective units per ml. by pock count on chorio-allantoic membrane
c = confluent lesion, 100 % of area
sc + = semiconfluent lesion, 70–80 % of area
sc = semiconfluent lesion, 50-70 % of area
sc − = semiconfluent lesion, <50 % of area
numbers = discrete vesicles
A = samples titrated in Lister Institute
B = samples titrated in Liverpool



Survival of dried smallpox vaccine in water at 100°C.

vaccinations; there was no evidence of any modification of the vesicular lesions obtained and no difference between the reactions produced by the samples stored at the higher temperatures and by those kept at −10°C.

Resistance at 100°C

Phials of dried vaccine from two different batches were immersed in boiling water. Two phials were removed at each sampling-time after exposure to this temperature for periods of from 30 up to 120 minutes and titrated separately by pock counting. The results are shown in the accompanying figure. Each point on the graph is the arithmetic mean of the titres of surviving virus in the pair of phials.

The initial titre of the virus was $6{\cdot}0 \times 10^8$ i.u. per ml. After 30 minutes the titre had fallen to $3{\cdot}0 \times 10^8$ i.u. per ml. and after 60 minutes to $6{\cdot}0 \times 10^7$ i.u. per ml. Thereafter there was no further detectable fall in titre up to 120 minutes. Thus the vaccine from these two batches after 2 hours' exposure to 100°C contains sufficient living virus for 100% of successful vaccinations. Since the dried material was in direct contact with the glass of the phial, it can be assumed that during the heating its temperature was not far short of the surrounding boiling water.

Heat Resistance of Other Batches

Samples from seven other batches of dried vaccine selected at random were stored at 37°C and 45°C for 8 weeks. After this period the samples stored at 45°C were each tested on groups of at least twenty-five men and produced 100% of successful vaccinations. Although when titrated by pock counting some of these batches showed slight deterioration at this temperature, the result of this test shows that the batch of vaccine used in the main storage test was not exceptionally heat-resistant.

Comment

Public-health authorities responsible for vaccination programmes involving the transport and storage of smallpox vaccine in hot climates with inadequate refrigeration will be relieved to know that a stable vaccine is available which will resist tropical temperatures for many months. They will also be able to maintain reserves available for immediate distribution in epidemics; if these reserves are held in refrigerators they should have a very long life indeed. So far we have not been able to detect any deterioration in refrigerated dried vaccine during periods of up to 2 years.

Summary

The results of tests on a dried smallpox vaccine stored at 37°C and 45°C for up to 2 years are recorded.

At the end of this period the vaccine stored at the higher temperature still produced 100% of successful vaccinations in man and showed only a slight decrease in potency by laboratory titration.

A dried smallpox vaccine with such resistance to heat should solve the major difficulty in carrying out vaccination programmes in hot countries with poor transport and inadequate refrigerating facilities. It would also enable adequate reserves to be held in these countries against epidemics.

The coöperation of Prof. A. W. Downie, F.R.S., and Dr. K. R. Dumbell, of the department of bacteriology, University of Liverpool, in the laboratory titrations of the vaccine is gratefully acknowledged.

REFERENCES

Cockburn, W. C., Cross, R. M., Downie, A. W., Dumbell, K. R., Kaplan, C., McClean, D., Payne, A. M-M. (1957) *Bull. World Hlth Org.* **16**, 63.
Collier, L. H. (1955) *J. Hyg., Camb.* **53**, 76.

PARTIAL MEGALOBLASTIC ERYTHROPOIESIS

IN ELDERLY ACHLORHYDRIC PATIENTS WITH MILD ANÆMIA

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DURING 1955 we tried to estimate the incidence of mild vitamin-B_{12} deficiency in mainly elderly patients with histamine-refractory achlorhydria. This group was selected as being likely to contain cases with vitamin B_{12} deficiency because pernicious anæmia is associated with histamine-refractory achlorhydria and is most common in the elderly.

The primary diagnostic criteria of vitamin-B_{12} deficiency were typical (Ehrlich) megaloblasts in the sternal bone-marrow and a typical response to treatment with vitamin B_{12}. Supplementary investigations, including estimation of the level of vitamin B_{12} in the blood-plasma, were also made.

In this way we discovered quite a high frequency of patients with incipient or partial megaloblastic erythropoiesis and mild anæmia. This group was compared with a group of achlorhydric patients with complete megaloblastic erythropoiesis (typical pernicious anæmia). A deficiency of iron and of vitamin C was common in both groups, especially the women—a finding which is of particular interest, because it makes the diagnosis of mild vitamin-B_{12} deficiency more difficult.

Material

The "*incidence material*" came from Medical Department E of the Frederiksberg Hospital, Copenhagen, and comprised all the cases diagnosed in 1955 as histamine-refractory achlorhydria and subjected to a study of the bone-marrow (which was done in as many of the patients as was practicable). These cases were compared with achlorhydric patients seen in 1954 (table I).

The "*compared material*" consisted of 13 achlorhydric patients with megaloblastic erythropoiesis observed in 1955, supplemented by similar cases seen in 1954 and 1956 to get two equally large groups of consecutively studied patients, one including 10 patients with total, and the other 10 patients with partial, megaloblastic erythropoiesis.

TABLE I—FREQUENCY OF STERNAL MARROW STUDIES AND INCIDENCE OF MEGALOBLASTIC ERYTHROPOIESIS IN PATIENTS WITH HISTAMINE-REFRACTORY ACHLORHYDRIA

Year	No. of patients admitted			No. examined for histamine-refractory achlorhydria	No. with histamine-refractory achlorhydria	No. submitted to sternal puncture	No. with megaloblastic erythropoiesis
	M	F	Total				
1954	907	1147	2054	384 (*18·5%*)	72 (*18·7%*)	30 (*41·7%*)	6 (*20·0%*)
1955	940	1228	2168	389 (*17·8%*)	93 (*23·9%*)	63 (*67·7%*)	13 (*20·6%*)

In addition, there were the patients with achlorhydria, normoblastic erythropoiesis, and mild anæmia whose vitamin-B_{12} level in the plasma had been determined, and two control series of "healthy" elderly persons in one of which serum-vitamin-B_{12} levels and in the other serum-iron levels had been determined.

Diagnosis and Treatment

Methods

The indications for examining a patient for achlorhydria were those ordinarily used in the department, especially gastro-intestinal complaints and anæmia. When histamine-refractory achlorhydria (fractional withdrawal of gastric juice for 60 minutes after subcutaneous injection of histamine hydrochloride 0·5 mg.) was found, we did a sternal puncture and examined the blood in the ordinary way—hæmoglobin level (100% = 14·8 g. of Hb per 100 ml.), red-cell count, colour-index $\frac{\text{Hb\%}}{(\text{erythrocytes (mill.)} \times 21)}$, total and differential white-cell counts, reticulocyte-counts, and determination of the serum-iron level by the method of Høyer (1950) and of the ascorbic-acid level (dichlorphenolindophenol method). If megaloblastic erythropoiesis was found, the level of vitamin B_{12} in the plasma was determined by one of us (H. P. Ø. K.) using the *Lactobacillus leichmanni* 313 (Kristensen 1956).

The sternal marrow was examined (by A. S. O.) partly in sections after coagulation and mounting and partly in smears stained by the method of May-Grünwald-Giemsa. Megaloblasts and promegaloblasts were counted, and recorded per 400 white cells. Total megaloblastic erythropoiesis is taken to mean that the only red cells were promegaloblasts and megaloblasts, whereas in partial megaloblastic erythropoiesis there were both normoblasts and megaloblasts. Megaloblastic erythropoiesis was diagnosed only when megaloblasts and promegaloblasts of the classical Ehrlich type were found. The discovery of maturation disturbances of the granulocytes with "pernicious-anæmia neutrophils" without typical changes in the erythroblasts—interpreted during recent years as a mild deficiency of antimegaloblastic substances (Jones 1943, Foy et al. 1950, Bastrup-Madsen 1954, Jewesbury 1954)—indicated the need for repeated examination, often after energetic treatment with iron. The same applies to the discovery of "megaloblast-like cells," "intermediary megaloblasts," and "macronormoblasts."

Other tests included examination of the fæces for blood; kidney-function tests; radiography of the stomach and intestines to detect cancer, sprue, strictures, &c.; determination of the excretion of fat in the stools; and (in most cases) Coombs's test.

Many patients were treated first with iron and ascorbic acid, partly because of low serum-iron levels and partly to accelerate, if possible, a megaloblastic alteration of the bone-marrow, which did not initially satisfy our criteria of megaloblastic erythropoiesis. When the diagnosis of megaloblastic erythropoiesis had been established, we administered vitamin B_{12} parenterally (cyanocobalamin 30–60 μg. daily for ten days). Treatment was continued with liver preparations ('Hepsol Fortior') or an oral combined preparation ('Cycoplex' capsules, each containing dried pyloric mucosa 50 mg. and vitamin B_{12} 5 μg), as well as iron and ascorbic acid. The patients were kept in hospital as long as necessary and were followed up after discharge. Their blood and bone-marrow were repeatedly examined to ascertain whether the erythropoiesis had returned to normal, the hæmoglobin level and erythrocyte-count had satisfactorily increased, and the levels of iron, ascorbic acid, and vitamin B_{12} had become normal.

Criteria

The diagnosis of *iron deficiency* was established by an increase in the reticulocytes and the colour-index during iron medication (either oral or parenteral) before antimegaloblastic treatment. Since the effect of iron was not specially investigated in all the cases, other criteria were also used (see below).

The diagnosis of *vitamin-C deficiency* was established by a serum-ascorbic-acid level of 180 μg. or less per 100 ml. followed by an increase to normal after treatment with ascorbic acid.

The diagnosis of *vitamin-B_{12} deficiency* was established by a decrease in the megaloblastic erythropoiesis in direct time relation to treatment with pure cyanocobalamin accompanied by a typical fall of the serum-iron level and an increase in the reticulocytes followed by an increase in the red cells to 4,500,000 per c.mm. in uncomplicated cases.

The diagnosis of *nephrogenous hæmolytic anæmia* was established by a spontaneous reticulocytosis of at least 4% after an abrupt decrease in the hæmoglobin and the red cells or persistent spontaneous reticulocytosis of at least 2% in patients with impaired renal function.

Results and Comments

"INCIDENCE MATERIAL"

In table I the material of 1955 is compared with that of 1954. Twice as many achlorhydric patients had their bone-marrow examined in 1955, and twice as many cases of megaloblastic erythropoiesis were found, as in 1954. The frequency with which the erythropoiesis of the cases submitted to bone-marrow study was interpreted as megaloblastic (20%) was unchanged from 1954 to 1955. Moreover the frequency with which the patients were examined for achlorhydria was the same (18%). Since, furthermore, achlorhydria was found only slightly more often in 1955, the findings indicate that technique, indications, and interpretation had not changed in 1955 except for the more frequent examination of the bone-marrow.

The frequent bone-marrow studies in achlorhydric patients in 1955 seem to be the main reason why the number of patients with newly diagnosed megaloblastic erythropoiesis was doubled.

Of the 93 patients (30 men and 63 women) in 1955 with histamine-refractory achlorhydria 7 had incipient or partial megaloblastic erythropoiesis. These patients belonged to the group of 51 who satisfied the criteria of mild anæmia (Hb 51–84%), age over 50, and no definite signs of pernicious anæmia. Of these 51 patients 5 did not have their bone-marrow studied; but, since they did not differ in other respects from the remaining 46

TABLE II—AVERAGE FINDINGS IN 51 ACHLORHYDRIC PATIENTS SEEN IN 1955, AGED 50 OR MORE, WITH MILD ANÆMIA BUT WITHOUT MANIFEST PERNICIOUS ANÆMIA (TOTAL MEGALOBLASTIC ERYTHROPOIESIS)

—	Erythropoiesis (sternal marrow)			
	Normoblastic	Partially megaloblastic	Total	Not examined
Total number	39	7	46	5
Men	8	0	8	1
Women	31	7	38	4
Age (yr.)	69	66	68	67
Hb (%)	68	71	68	70
Red cells (millions per c.mm.)	3·40	3·13	3·36	3·40
Colour-index	0·95	1·08	0·96	0·98
Serum-iron level (μg. per 100 ml.)	54	56	54	43

TABLE III—FINDINGS IN 10 PATIENTS (7 FEMALES AND 3 MALES) WITH TOTAL AND 10 (8 FEMALES AND 2 MALES) WITH PARTIAL MEGALOBLASTIC ERYTHROPOIESIS BEFORE AND AFTER TREATMENT

Finding	Megaloblastic erythropoiesis			
	Before treatment		After treatment	
	Total	Partial	Total	Partial
Age (yr.)	44–84 (*av. 66*)	53–87 (*av. 69*)	..	..
Promegaloblasts and megaloblasts in bone-marrow :				
Per 400 " white " cells	678–177 (*av. 310*)	101–14 (*av. 55*)	..	..
Per 100 " red " cells	100 (*av. 100*)	94–13 (*av. 43*)	..	..
Hæmoglobin (%)	33–63 (*av. 45*)	51–83 (*av. 71*)	88–111 (*av. 100*)	85–100 (*av. 90*)
Red cells (millions per c.mm.)	1·13–2·21 (*av. 1·65*)	2·45–3·62 (*av. 3·11*)	4·62–5·47 (*av. 4·98*)	4·02–4·56 (*av. 4·28*)
Colour-index	1·16–1·56 (*av. 1·30*)	0·95–1·31 (*av. 1·09*)	0·85–1·07 (*av. 0·96*)	0·94–1·07 (*av. 1·00*)
Serum-iron (μg. per 100 ml.)	45–200 (*av. 120*)	7–169 (*av. 76*)	..	..
Plasma level of vitamin B_{12} (μμg. per ml.)	10–85 (*av. 52*)	55–205 (*av. 127*)	..	..
Serum-ascorbic acid (μg. per 100 ml.)	90–330 (*av. 143*)	20–350 (*av. 144*)	..	..
Highest reticulocyte-count after vitamin-B_{12} therapy (per 1000 red cells)	..	..	62–276 (*av. 115*)	20–200 (*av. 52*)

(table II), the incidence of partial megaloblastic erythropoiesis was very probably the same, therefore we can disregard these 5 in computing the incidence. The 46 patients thus make up a series in which the incidence of partial megaloblastic erythropoiesis can be computed. The result is as follows: in 46 consecutive patients, aged more than 50, with histamine-refractory achlorhydria and mild anæmia but no definite signs of pernicious anæmia, the bone-marrow showed that 7 had incipient or partial megaloblastic erythropoiesis.

Table II shows that the sex-distribution in the series is so unequal that the incidence of partial megaloblastic erythropoiesis seems to be about 20% for women (7/38) and is unknown for men (0/8). The same table shows that the difference between the 7 patients with partial megaloblastic erythropoiesis and the others as regards age, hæmoglobin level, red-cell count, colour-index, and serum-iron level is so slight that the true nature of the erythropoiesis will very easily escape detection if the bone-marrow is not examined (see also discussion below).

" COMPARED MATERIAL "

Table III gives average data for 10 cases of total and 10 cases of partial megaloblastic erythropoiesis. The data for the 10 patients with partial megaloblastic erythropoiesis have already been reported by Pedersen et al. (1957b).

Sex and Age

The distribution is the same in both groups.

Bone-marrow

As might be expected, the greatest changes were found in patients with total megaloblastic erythropoiesis. In partial megaloblastic erythropoiesis about 10–90% (average 43%) of the erythroblasts were megaloblastic. In 3 cases definite Ehrlich megaloblasts did not develop until intensive treatment with iron had been given, and in 2 cases macroforms in the granulocytes (e.g., giant metamyelocytes) were seen when typical megaloblasts were not yet present.

Hæmoglobin, Erythrocyte-count, and Colour-index

In the 10 patients with total megaloblastic erythropoiesis these factors were typical of pernicious anæmia. All the patients with partial megaloblastic erythropoiesis had mild anæmia, but a few were at the limit of normal. Later we had occasion to diagnose partial megaloblastic erythropoiesis in non-anæmic patients, as might be expected. The colour-index was surprisingly low in this group (average 1·09). Only 3 of the 10 had a colour-index above normal ($\geq$1·15), and in 2 cases the colour-index was $<$1·00. In the patients with partial megaloblastic erythropoiesis the blood smears showed some macrocytosis of the red cells, but the variations in their size were not thoroughly examined. Like the erythrocyte-counts, the average leucocyte and thrombocyte counts were decreased, mostly in patients with total megaloblastic erythropoiesis. Lymphocytosis too was more pronounced and macropolycytes were more commonly seen in total megaloblastic erythropoiesis.

Serum-iron Level

On the average, the levels were only 120 and 76 μg. per 100 ml. in total and in partial megaloblastic erythropoiesis respectively. In the 5 men it was 150 μg. per 100 ml. and in the 15 women 81 μg. per 100 ml. In comparison, in 9 men and 9 women aged more than 50 (average 65) without anæmia and with normal gastric secretion the serum-iron levels were 107 and 103 μg. per 100 ml. respectively (Pedersen et al. 1957a). Thus, whereas the men had a raised serum-iron level, as might be expected in pernicious anæmia, the women, both those with total and those with partial megaloblastic erythropoiesis, had a lower serum-iron level than normal. Without doubt the main cause of this low initial serum-iron level was iron deficiency (Pedersen et al. 1957a). In 5 patients with an initial serum-iron level of 100 μg. per 100 ml. at the most we observed a reticulocytosis, and an increase in the colour-index and sometimes in the hæmoglobin, during intensive treatment with iron before antimegaloblastic treatment was instituted. Afterwards, the latter caused a second typical reticulocytosis and a fall in the serum-iron level.

In addition, the following facts gave indirect proof of iron deficiency :

(1) Some initial serum-iron levels were so low ($\leq$30 μg. per 100 ml.) that they were only explicable by iron deficiency.

(2) When the initial serum-iron levels were somewhat higher (up to 100 μg. per 100 ml.) we found such low values ($\leq$30 μg. per 100 ml.) immediately after the institution of antimegaloblastic therapy that iron deficiency must be considered proved.

(3) As mentioned above, iron and ascorbic acid were often administered before antimegaloblastic therapy was started. Lately we routinely continued or instituted this treatment with iron and ascorbic acid at the same time as specific therapy. Despite this iron medication we found serum-iron levels of $\leq$40 μg. per 100 ml. in several patients after having administered specific therapy for some time. In some of the

cases it was necessary to give an intravenous injection of about 2–3 g. of iron before the iron deficiency was overcome.

In the present series 16 of the 20 patients appear to have had iron deficiency which was demonstrable, in most of the cases, at the time when megaloblastic erythropoiesis was diagnosed. Both groups of patients with megaloblastic erythropoiesis, particularly the women, characteristically had vitamin-B_{12} deficiency and iron-deficiency anæmia. It seems characteristic also that the iron deficiency was traced back to hæmorrhage in only 2 cases.

Plasma-vitamin-B_{12} Level

In 19 cases the vitamin-B_{12} level in the blood-plasma was determined on one to three occasions before anti-megaloblastic therapy was instituted. In the patients with total megaloblastic erythropoiesis the vitamin-B_{12} level was, as expected, very low (average 52 μμg. per ml.). In the patients with partial megaloblastic erythropoiesis the corresponding value was 127 μμg. per ml. (in 4 cases <100, in 3 cases 100–150, and in another 3 >150 μμg. per ml.). Table IV, which also gives the intra-individual variation, compares these two groups with a group of patients with achlorhydria but without megaloblastic changes in the bone-marrow (from the "incidence material") and with a group of "healthy" persons in whom the gastric secretion and sternal bone-marrow were not examined. In the last two groups the average values were 275 and 395 μμg. per ml. respectively. The average values conform to the degree of megaloblastic alteration in the bone-marrow in the three achlorhydric groups. In addition, the table makes clear the far from surprising fact that pernicious anæmia does not comply

TABLE IV—PLASMA LEVEL OF VITAMIN B_{12} IN ANÆMIC PATIENTS WITH HISTAMINE-REFRACTORY ACHLORHYDRIA AND IN HEALTHY NON-ANÆMIC PEOPLE

Group	Age (yr.)	No. of persons	Histamine-refractory achlorhydria	Megaloblastic erythropoiesis	Plasma level of vitamin B_{12} (μμg. per ml.)
Severe anæmia (Hb 45%)	44–84	10	+	Total	10–100 (*av. 52*)
Mild anæmia (Hb 71%)	53–87	10	+	Partial	(10) 70–220 (*av. 127*)
Mild anæmia (Hb 70%)	50–86	26	+	None	88–725 (*av. 275*)
Healthy people* (Hb ≧ 85%)	67–88	29	Not examined	Not examined	190–770 (*av. 395*)

* Kristensen's (1956) series.

with an all-or-nothing law. Although the four groups overlap, the agreement between the bone-marrow findings and the vitamin-B_{12} levels in the plasma is so good that determination of the latter can apparently restrict the number of patients who need a bone-marrow examination or other tests, when a deficiency of vitamin B_{12} is suspected.

Serum-ascorbic-acid Level

The initial serum-ascorbic-acid level was estimated in 15 of 20 patients and found to be low in 12 (extremely low in some of them). There was no difference between the two groups; hence the vitamin-C deficiency may be added to the iron-deficiency and the vitamin-B_{12} deficiency as a characteristic of both groups.

Tongue Signs and Neurological Signs

Of the patients with total megaloblastic erythropoiesis 7 presented objective tongue signs and 3 loss of reflexes, whereas of those with partial megaloblastic erythropoiesis 5 had objective tongue signs and 3 paresis or loss of reflexes.

Clinical Types with Partial Megaloblastic Erythropoiesis

The patients in this group appear to fall into two clinical types:

(1) An ordinary pernicious-anæmia type (in our series 4 elderly grey-haired blue-eyed women in a good nutritional state—e.g., case 1).

(2) The other type—represented by 4 or 5 cases—was characterised by its complications and by the multiple origin of the anæmia. Patients in the second category might present—in addition to anæmia with deficiencies of iron, vitamin C, and vitamin B_{12}—nephrogenic, more or less hæmolytic, anæmia as well as infectious and/or toxic anæmia—e.g., case 3.

Case 2 represents a transition between these two types.

Illustrative Case-reports

Case 1: *sideropenic anæmia+megaloblastic anæmia.*—A woman, aged 74, somewhat arteriosclerotic but otherwise well-preserved, was admitted in 1953 with degenerative osteo-arthritis of the knees and Hb 91%, and readmitted in 1954 with the same condition and Hb 85%, red cells 4,040,000 per c.mm., and colour-index 1·00. In 1955 she was admitted complaining of intermittent diarrhœa. She had Hb 72%, red cells 3,520,000 per c.mm., colour-index 0·90, serum-iron level 37 μg. per 100 ml., and serum-ascorbic-acid level 122 μg. per 100 ml. Histamine test showed achlorhydria, and plasma-vitamin-B_{12} level was 120 μμg. per ml. Sternal puncture revealed normoblastic erythropoiesis, but the granulocytes showed large neutrophil forms with hypersegmented nuclei. After intensive iron medication the Hb increased to 85% and the colour-index to 1·10, and there was a simultaneous increase in the reticulocytes. A month later there was unequivocal partial megaloblastic erythropoiesis, and the plasma-vitamin-B_{12} level was 135 μμg. per ml. Administration of vitamin B_{12} produced a renewed increase and decrease in the reticulocytes and a return of the bone-marrow to normal. The other usual hæmatological data did not become normal, however, until intensive treatment with iron, vitamin C, and hepsol had been continued for ten months. The only reasons that could be suggested were arteriosclerosis and old age; there were no radiological changes in the stomach and intestines and no increased excretion of fat in the fæces.

Case 2: *sideropenic anæmia+megaloblastic anæmia+mild nephrogenic anæmia.*—A woman, aged 53, who for the past twenty-three years had noticed burning of the tongue and had been receiving "acid tablets" for many years, had been admitted many times to other hospitals with migraine, muscle pain, and nervousness. During the past six months she had been getting ever more tired and nervous. A month before admission she entered the psychiatric department of our hospital with the diagnosis of mental depression and hysteria. During her stay there her Hb decreased from 89 to 74%, red cells from 3,950,000 per c.mm. to 3,500,000 per c.mm., and colour-index from 1·08 to 1·00. Sternal marrow showed incipient megaloblastic erythropoiesis. The serum-iron level was 68 μg. per 100 ml., the ascorbic-acid level 120 μg. per 100 ml., and the plasma-vitamin-B_{12} level 85 μμg. per ml. Treatment, first with iron and vitamin C and later with vitamin B_{12}, produced an increase and decrease of the reticulocytes on both occasions and a return of the sternal bone-marrow to normal after vitamin-B_{12} therapy. It was not until the treatment had been given for six months, however, that the blood values became satisfactory. In addition to iron deficiency and vitamin-B_{12} deficiency the patient had chronic pyelonephritis with occasional albuminuria and colipyuria (treated with various antibiotics) and slightly impaired renal function. After treatment she felt "completely transformed"; her tongue signs and fatigue had disappeared.

Case 3: *sideropenic anæmia+megaloblastic anæmia+nephrogenic anæmia with hæmolytic component+toxic-infectious anæmia.*—A woman, aged 55, had been admitted several times during the past ten years with various muscle pains, colitis, pyelitis (*Esch. coli*), and poisoning with phenacetin. A month before admission to our department her Hb was 80%, red-cell count 3,340,000 per c.mm., and colour-index 0·94. She had previously been energetic and efficient, but during the past few years things had gone wrong. She had not been out of doors for the past eighteen months and had been confined to bed for the past nine months (partly because

of a fracture of the spine). She was known as a phenacetin addict and often had to be given injections of morphine by the night doctor. She was transferred from the psychiatric department because of pain in her abdomen and loin, malaise, nausea, and vomiting. She had flaccid muscles and was anæmic, yawning, sleepy, grey-cyanosed like "tablet eaters," and looking more debilitated at first glance than later. Her Hb was 67%, colour-index 1·20, serum-iron level 52 μg. per 100 ml., ascorbic-acid level 130 μg. per 100 ml., and plasma-vitamin-B_{12} 203 μμg. per ml. Sternal marrow showed partial but severe megaloblastic erythropoiesis. During the first few days her temperature rose, and on the sixth day colibacillæmia was found. Blood-transfusion, iron, ascorbic acid, and vitamin B_{12} produced a striking increase in reticulocytes (20%) on the seventh day after the start of vitamin-B_{12} therapy, but at the same time the Hb decreased to 43% and the colour-index to 1·07. This was no doubt because of a hæmolytic crisis due to the colisepsis in connection with kidney disease (albuminuria 0·8 g. per 100 ml., impaired power of concentration), and methæmoglobinæmia (0·8 per 100 ml.). However, on the fourteenth day of vitamin-B_{12} therapy the erythropoiesis was normoblastic. The infection was treated with penicillin, streptomycin, and erythromycin and eventually responded after four weeks' treatment. Thereupon the blood values rapidly increased. Provocative doses of phenacetin and sulphathiazole did not produce any reticulocytosis or decrease in Hb. By energetic training and continued treatment of the anæmia we got the patient out of bed. She put on 7 kg. in weight, her erythrocyte-sedimentation rate fell, and she was "feeling better than in the past fifteen years." After her discharge the blood values tended to fall slightly when she began "tablet eating" again (methæmoglobinæmia 0·5 per 100 ml.).

Response to Treatment

In the patients with total megaloblastic erythropoiesis the reticulocytes and other blood values increased appropriately in a reasonable time (table III). On the treatment used, the levels of vitamin B_{12}, iron, and ascorbic acid in the serum were fairly easy to keep normal.

In the patients with partial megaloblastic erythropoiesis the increase in reticulocytes after treatment with iron + ascorbic acid and with vitamin B_{12} was also appropriate in view of the high initial values of Hb and red cells (table III). The bone-marrow was immediately rendered normoblastic by vitamin-B_{12} therapy, and the ascorbic-acid and vitamin-B_{12} levels in the serum rapidly returned to normal. On the other hand, it was difficult to keep the serum-iron levels normal in some patients, who required 2–3 g. intravenously for a few months before this was accomplished. It was also difficult to obtain a sufficient increase in the Hb and red cells in these patients. This was explained partly by the presence of anæmia of multiple origin, but often six months' intensive treatment with iron, ascorbic acid, and vitamin B_{12} was necessary, also in the ordinary pernicious-anæmia type. In 3 patients no explanation other than arteriosclerosis was found. The most intensive therapy was necessary in the patients with partial megaloblastic erythropoiesis, but it was extremely successful when the complications were not too disabling.

Discussion

Incidence of Partial Megaloblastic Erythropoiesis

So far as we know, no other study on partial megaloblastic erythropoiesis, confirmed by sternal puncture, in achlorhydric people has been published; but its incidence, as found by us, fits in with recent studies on the incidence of gastric atrophy and reduced absorption of radioactive vitamin B_{12} in achlorhydric people:

From biopsies of gastric mucosa in 42 cases of hypochromic anæmia Davidson and Markson (1955) concluded that anæmia might coexist with a normal stomach, with atrophic gastritis, and with gastric atrophy. There were no specific changes of the gastric mucosa in hypochromic anæmia, although abnormalities were more common than in a control series of 31 non-anæmic patients. Gastric atrophy was equally common in both groups—10% and 13% respectively. From their data it can be calculated that 24 patients (20 with secondary anæmia and 4 without anæmia) had histamine-refractory achlorhydria, and that 7 of them had gastric atrophy either equal to or approaching that which is typical of pernicious anæmia.

Badenoch (1954), examining biopsy specimens from 24 patients with hypochromic anæmia and achlorhydria, found severe gastric atrophy in 7. In 1 of them the changes were indistinguishable from the atrophy of pernicious anæmia, and in 6 the changes approached this form of atrophy. In 4 of the patients the absorption of radioactive vitamin B_{12} was decreased.

Finally, Schilling et al. (1955), studying 31 patients with various diseases but all with histamine-refractory achlorhydria without "laboratory evidence of pernicious anæmia," found decreased absorption of vitamin B_{12} in 8.

We have added figures from the above studies to those derived from the present study. The results are as follows: of 48 patients with histamine-refractory achlorhydria with or without anæmia 14 had gastric atrophy (in other words, they ran a great risk of developing pernicious anæmia); in 12 of 55 such patients the quantity of intrinsic factor was reduced (i.e., they were already developing pernicious anæmia); and 7 of 46 such patients had unequivocal megaloblastic erythropoiesis, probably due to incipient pernicious anæmia in most cases.

If we disregard the number of patients, their age-distribution, diseases, &c., the trend of these figures suggests that the incidence of partial megaloblastic erythropoiesis found by us is probably not too high. Moreover Davies (1931), in a careful study of the peripheral blood of 15 patients with histamine-refractory achlorhydria and secondary anæmia, found indubitable "dimorphous anæmia" in 2.

Iron Deficiency Combined with Vitamin-B_{12} Deficiency

Most of the patients in the "compared material" had anæmia due to iron deficiency and vitamin-B_{12} deficiency. The frequent coexistence of these two deficiencies, especially in women, has been emphasised by Whitby and Britton (1953), and Trowell (1943, 1944) used the designation dimorphous anæmia for this combination in African Negroes.

Iron deficiency is severe both in patients with total and in patients with partial megaloblastic erythropoiesis, but the vitamin-B_{12} deficiency is considerably more severe in patients with total megaloblastic erythropoiesis. As a result patients with total megaloblastic erythropoiesis appear clinically to have pernicious anæmia complicated by iron deficiency, and the usual diagnostic criteria of pernicious anæmia are not obscured thereby, except that there is no initial increase in the serum-iron level. Since patients with pernicious anæmia are usually under thorough hæmatological supervision, the iron deficiency is nearly always diagnosed, usually when the blood ceases to improve despite continued anti-megaloblastic treatment—a phenomenon well known to clinicians.

With patients who have partial megaloblastic erythropoiesis this is not so. The anæmia presents the characteristics of iron-deficiency or other form of simple anæmia, and the complicating vitamin-B_{12} deficiency may easily escape diagnosis for a very long time. The primary diagnostic difficulties may be seen from tables II and III. There is a negligible difference between the average data for patients with normoblastic (sideropenic) anæmia and patients who also have partial megaloblastic erythropoiesis. The typical effects of the two deficiencies proceed in opposite directions and may neutralise each other in some hæmatological data, which therefore give a false impression, the colour-index and the serum-iron, for instance, not being increased (tables II and III). In 1 of our patients (with 55 μμg. of vitamin B_{12} per ml. of plasma) the colour-index was 0·95 and the serum-iron level 46 μμg. per 100 ml.; this does not immediately suggest megaloblastic erythropoiesis.

When the mild anæmia has been treated and perhaps partly remedied with, for example, iron, the complicating vitamin-B_{12} deficiency is seldom diagnosed, because such patients are usually not submitted to thorough hæmatological control. This very time, however, would be good for discovering vitamin-B_{12} deficiency because it seems that when one deficiency is relieved another is unmasked. Although perhaps the causal relationship has not been strictly proved, iron therapy seems to promote the signs of deficiency of antimegaloblastic substances. Heath (1932), Miller and Dameshek (1941), and Trowell (1943, 1944) reported cases of pronounced normoblastic iron-deficiency anæmia which bone-marrow studies showed to have become megaloblastic when treated with iron—to the great surprise of the investigators. In obscure cases we have, as mentioned above, systematically used intensive iron therapy to this end and have thereby induced typically megaloblastic erythropoiesis.

Partial is more interesting than total megaloblastic erythropoiesis with iron deficiency because in this condition it is more difficult to diagnose vitamin-B_{12} deficiency and iron deficiency. This difficulty, however, has probably not prevented correct treatment in some cases in spite of an incorrect diagnosis—e.g., when liver therapy has been successful in dealing with the anæmia of achlorhydric patients after iron has proved ineffective.

Since vitamin-B_{12} deficiency is not uncommon in achlorhydric patients with mild anæmia and is often complicated by iron deficiency and/or anæmia of multiple origin, a closer examination of the peripheral blood picture and a more frequent use of sternal bone-marrow are essential if this condition is to be diagnosed more often. Besides, determination of the vitamin-B_{12} content of the blood and repeated examination of the bone-marrow after intensive treatment with iron seem to be important diagnostic procedures.

Vitamin-C Deficiency

This condition was found in nearly all the patients in both groups. Since vitamin C increases the uptake of dietary iron (Moore 1955), vitamin-C deficiency may be expected to contribute to the iron deficiency. Vitamin-C deficiency may play a part in the development of megaloblastic erythropoiesis because vitamin C takes part in the metabolism of folic acid; but we have not observed any decrease of megaloblastic erythropoiesis or of reticulocytosis after the administration of large doses of ascorbic acid, even though the serum-ascorbic-acid level has been brought back to normal by this treatment.

Deficient Diet of Aged Persons with Achlorhydria

Since cancer and hæmorrhage were found only in exceptional cases, the main cause of iron deficiency must be a decrease in absorption and/or administration of iron. The absorption of iron must have been greatly reduced in those patients in whom only intravenous administration could deal with the iron deficiency. But the diet may also have been poor, qualitatively and/or quantitatively. Although a purely nutritional iron-deficiency anæmia in men and postmenopausal women is often considered merely a theoretical possibility, a diet which per se is not particularly poor may become so insufficient for an achlorhydric person with little appetite, dyspepsia, and poor absorption that a previously acquired iron-deficiency persists. However, the pronounced vitamin-C deficiency indicates that the diet would have been faulty even for healthy people, because we have so far seen only 1 patient who could not absorb vitamin C given by mouth. We have found that lonely old people often take incredibly little and of a very poor diet. This agrees with more elaborate geriatric studies (Eckerström and Geill 1955, Lyons and Trulson 1956). It therefore seems probable that the iron deficiency is due not exclusively to a reduced capacity to absorb iron but also to insufficient nutrition. Achlorhydric and other dyspeptic patients—especially elderly women—appear to be particularly exposed to such faulty nutrition.

Possibly some of our cases of vitamin-B_{12} deficiency were partly due to inadequate diet (cf. Harrison et al. 1956). To investigate this question further studies with labelled vitamin B_{12} and gastric biopsies would be necessary.

Summary

Serial studies of the sternal marrow in 46 patients, aged 50 or more, with histamine-refractory achlorhydria and mild anæmia but no manifest pernicious anæmia showed that 7 had partial or incipient megaloblastic erythropoiesis. This incidence agrees with recent studies on the incidence of gastric atrophy and reduced absorption of vitamin B_{12} in achlorhydric people.

Partial megaloblastic erythropoiesis in patients with mild anæmia is too seldom diagnosed because mild vitamin-B_{12} deficiency is often masked by more or less severe iron deficiency (dimorphous anæmia) and vitamin-C deficiency and/or anæmia of a different pathogenesis; hence some ordinary hæmatological studies (colour-index, serum-iron level) may be misleading. Studies of the sternal marrow are therefore of the utmost diagnostic significance. Determination of the vitamin-B_{12} level in the blood may also acquire importance, and it is emphasised that relief of iron deficiency may accelerate the signs of vitamin-B_{12} deficiency in the erythropoiesis.

Two clinical types with partial megaloblastic erythropoiesis are described: one is characterised by incipient ordinary pernicious anæmia complicated by iron-deficiency anæmia, and the other by anæmia of multiple origin.

Treatment with iron and vitamins B_{12} and C is rewarding but has to be intensive and prolonged (this applies particularly to the iron medication) before the blood returns to normal.

As the vitamin-B_{12} level in the blood-plasma falls, we can recognise four categories: (1) apparently healthy people, (2) histamine-refractory achlorhydric people with normoblastic erythropoiesis, (3) partial megaloblastic erythropoiesis, and (4) total megaloblastic erythropoiesis. The transition between the groups appears to be fairly even, as might be expected.

Unlike the vitamin-B_{12} deficiency, the incidence of iron and vitamin-C deficiencies appears to be equal in patients with total and in patients with partial megaloblastic erythropoiesis. Vitamin-C deficiency is due to a faulty diet, and iron deficiency to insufficient absorption and, probably, a poor diet as well.

Elderly achlorhydric people, especially women, probably often receive a diet which is very poor both qualitatively and quantitatively.

REFERENCES

Badenoch, J. (1954) *Proc. R. Soc. Med.* **47**, 426.
Bastrup-Madsen, P. (1954) *Acta med. scand.* **148**, 13.
Davidson, W. M. B., Markson, J. L. (1955) *Lancet*, ii, 639.
Davies, D. T. (1931) *Quart. J. Med.* **24**, 447.
Eckerström, S., Geill, T. (1955) Geriatri. Copenhagen; p. 216.
Foy, H., Kondi, A., Hargreaves, A. (1950) *Lancet*, i, 1172.
Harrison, R. J., Booth, C. C., Mollin, D. L. (1956) *Ibid*, i, 727.
Heath, H. (1932) *J. clin. Invest.* **11**, 808.
Høyer, G. (1950) *Scand. J. clin. Lab. Invest.* **2**, 125.
Jewesbury, E. C. O. (1954) *Lancet*, ii, 307.
Jones, O. P. (1943) *Arch. Path.* **35**, 752.
Kristensen, H. P. Ø. (1956) *Nord. Med.* **55**, 85.
Lyons, J. S., Trulson, M. F. (1956) *J. Geront.* **11**, 66.
Miller, E. B., Dameshek, W. (1941) *Arch. intern. Med.* **68**, 375.
Moore, C. V. (1955) *Amer. J. clin. Nutr.* **3**, 3.
Pedersen, J., Lund, J., Dybkær, R. (1957a) *Nord. Med.* (in the press).
— — Sæborg Ohlsen, A., Kristensen, H. P. Ø. (1957b) *Ugeskr. Læg.* **119**, 1.
Schilling, R. F., Clatanoff, D. V., Korst, D. R. (1955) *J. Lab. clin. Med.* **45**, 926.
Trowell, H. C. (1943) *Trans. R. Soc. trop. Med. Hyg.* **36**, 151.
— (1944) *Ibid.* **37**, 19.
Whitby, L. E. H., Britton, C. J. C. (1953) Disorders of the Blood. 7th ed., London.

TRACHEOTOMY FOR FLAIL CHEST

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INJURIES to the thorax, with fracture of one or more ribs or costal cartilages, are very common and are quite simply and satisfactorily treated in most cases; but the crush injury causing multiple fracture of ribs and costal cartilages, producing "stove-in" or "flail" chest, with its paradoxical movement, is surprisingly rare. Proctor and London (1955) collected only 8 recorded cases of stove-in chest, with paradoxical respiration requiring surgical treatment in 344,000 injured persons treated at the Birmingham Accident Hospital in 1944–52; only 1 of the 8 patients survived. The gravity of this condition and its high mortality are emphasised by many workers—e.g., Cameron et al. (1949), Coope (1948), Elkin and Cooper (1943), Gardner (1946), Heroy and Eggleston (1951), and Rives and Kahle (1939).

Results of Flail Chest

The pain on breathing limits the respiratory excursion of the chest, and the paradoxical movement of the unstable part of the chest wall reduces still further the tidal volume—i.e., the breathing is shallow and inefficient, and aeration of the lungs is poor.

More rapid and vigorous respiratory efforts result, involving the accessory muscles of respiration, with accompanying exhaustion and increased pain.

There is loss of effective cough, with accumulation in the tracheobronchial tree of secretions which increase the resistance to inspiration and expiration. The intrapleural negative pressure on inspiration is greatly increased and on expiration is decreased or may become positive. This increases paradoxical movement. The deterioration in the patient's condition at this stage is often striking and alarming.

Considerable anxiety is caused by a sense of suffocation (Heroy and Eggleston 1951).

Treatment

In the mild case adhesive strapping may suffice; for the more severe injuries most workers suggest skeletal traction applied to the ribs, costal cartilages, or sternum (Bailey and Matheson 1953, Butler 1938, Davis 1956, DeBakey 1942, Dolley and Brewer 1942, Wise 1942).

Jaslow (1946) describes the use of towel-clips and screw-hooks, Jones and Richardson (1926) the use of cervical forceps, and Proctor and London (1955) the use of cup-hooks, applied to the sternum in each case. Heroy and Eggleston (1951) used a sharp clamp designed originally for reducing Bennett's fracture. Williams (1948) used pericostal traction with towel-clips.

McKim (1943) treated a case by open operation and reduction of the displacement, inserting Kirschner wires across the fracture sites, and Sweet (1954) advises open operation and fixation of each fracture with stainless steel wire. Coleman and Coleman (1950) advise wiring each fracture, sometimes with the addition of an intramedullary peg; in their cases the average number of ribs so treated was 6, but in one case 16 ribs were wired.

Belsey (1953) and Bonnin (1951) advise a plaster-of-paris cuirass to immobilise the floating segment.

Hagen (1945) described an interesting case in which he used a Drinker respirator, and Brooks (1942) found the Nuffield respirator satisfactory for this purpose. Gray (1942) and Watson-Jones (1955) also advise the use of a mechanical respirator.

In all these instances apparatus is required which may not be at hand and requires careful and continuous surveillance. Skeletal traction also entails the risk of infection, which it is so important to avoid in this condition. Skeletal traction appears to have little effect in preventing the ultimate deformity of the thorax (Jones and Richardson 1926, Proctor and London 1955).

Treatment of flail chest by tracheotomy has been described by Carter and Giuseffi (1953), who have used the method since 1949, and the treatment in the two cases described here was based on their method.

In a survey of the indications for tracheotomy in modern medicine and surgery (Pitman and Wilson 1955) flail chest was not mentioned; nor was it included in the discussion on the value of tracheotomy in acutely ill surgical patients by Colvin and Morrison (1953), who emphasise, however, the importance of prophylactic tracheotomy in very ill post-operative patients in whom the cough is expected to be ineffective.

Rationale of Tracheotomy

1. The tracheobronchial tree can be aspirated easily and quickly by the nurses to remove the secretions which accumulate owing to the lack of effective cough and tend to produce the "wet lung" syndrome described by Brewer et al. (1946). The removal of bronchial secretions reduces the resistance to air movements in the tracheobronchial tree and removes the sense of suffocation.

Aspiration through the tracheotomy tube is far simpler and less exhausting to the patient than the repeated bronchoscopic aspiration advised by most workers.

2. Dead space is reduced by about 60–75 c.cm., the volume of the mouth, nose, and pharynx in anæsthetised patients (Guedel and Waters 1928). Carter and Giuseffi (1953), working on necropsy specimens, found the average volume to be 117 c.cm., but one would expect the dead space to be less in the living, owing to the tone of the pharyngeal constrictors. Tidal volume is much reduced when paradoxical movement of a segment of the thoracic wall takes place, and the reduction in dead space brought about by tracheotomy, and the equivalent increase in *effective* tidal volume, are probably of clinical importance in the efficacy of tracheotomy.

3. The resistance to air movements imposed by the upper air-passages, chiefly owing to the small cross-section area of the glottis, and caused by the turbulence of air currents in the pharynx, nose, and mouth, is removed; hence respiratory movements can take place more freely. The range of negative pressure in the thorax between the limits of the respiratory cycle is reduced, and there is thus less tendency for the "floating segment" of the thoracic cage to be sucked in on inspiration and blown out on expiration (Carter and Giuseffi 1951). Clinically this is apparent in the visibly decreased amplitude of the paradoxical movement. Again this favours an increased effective tidal volume, with the expenditure of less energy and causing less pain.

4. Oxygen consumption is decreased because of the diminished muscular exertion needed to provide satisfactory ventilation.

Each of these four factors contribute something to break a vicious circle and to change laboured, rapid, and shallow into easier, deeper, and slower breathing.

With the relief of dyspnœa and pain the patient becomes less frightened and can relax and sleep.

One must anticipate the complications of hæmothorax, which occurs frequently after chest injuries (Butler 1938) and may become manifest some days after injury (Cato and Norman 1940), and perhaps pneumothorax, either of which will reduce the patient's vital capacity and increase dyspnœa or accelerate its onset.

Tracheotomy is easy to effect under local anæsthesia, but the patient has to lie supine and quite still for a few minutes. As indicated in case 2, the onset of complications causes dyspnœa and extreme discomfort when the patient is supine. For these reasons it is suggested that tracheotomy should be seriously considered in all cases of flail chest immediately on admission.

Case-reports

Case 1.—A lorry driver, aged 45, was admitted to the Pontefract General Infirmary on March 5, 1955. He had been leaning over the chassis of his tipping lorry doing maintenance work, with the body of the lorry in the raised position, when the hydraulic mechanism failed and the body descended. He sustained a crush injury to the thorax and minor abrasions.

On examination he had traumatic asphyxia with exophthalmos, hæmorrhages into the conjunctivæ, petechiæ into the facial skin, and paradoxical sternal movement grotesque in its amplitude. He was very anxious, restless, and slightly cyanotic and complained of severe pain in his chest. His respirations were only slightly increased in rate but were very laboured, involving the accessory muscles of respiration. Radiography showed anterior fractures of ribs 2–7 on the right side and clinically there were also fractures of the costal cartilages or separation at the costochondral junctions 2–6 on the left side.

Treatment and Progress.—Strapping was applied to the front of thorax, but this did little to diminish the paradoxical movement or to ease the pain. Penethamate hydriodide ('Estopen') 500,000 units b.d. was given prophylactically. During the night the patient's chest became wet, and by next morning his respirations were 50 a minute, and his inability to cough, due to both pain and lack of tussive force, caused great distress. Tracheotomy was done, under local anæsthesia (2% lignocaine), through a vertical incision, the isthmus of the thyroid gland being divided to give access to the second tracheal ring. A Jaques's catheter inserted through the tracheotomy tube and attached to an anæsthetic suction pump removed a large amount of slightly bloodstained mucoid secretion from the trachea and main bronchi. The patient was at once less distressed. He was nursed in an almost sitting position in a steam tent, aspiration being done every fifteen minutes. By the next day his respirations had decreased to 30 a minute, and thereafter they remained 24–30 a minute. On the following day radiography showed partial collapse of the lower left lobe with elevation of the left diaphragm and slight surgical emphysema. 'Alevaire' was then administered as a mist by attaching an oxygen cylinder to a nebuliser containing the detergent liquid. This loosened the mucoid secretion and enabled it to be removed by the suction catheter, which was used as often as required. The patient remarked on the efficacy of alevaire, and the treatment was given for a few minutes every hour. On March 12 the patient was allowed up for bed-making, and on March 14 the tracheotomy tube was removed. At that time the paradoxical movement had almost ceased, the patient had no pain, and he had been able to expectorate for two or three days despite the presence of the tracheotomy tube. He continued to expectorate large quantities of sputum but had a little dyspnœa at night for some time. Serial radiographs showed gradual improvement and expansion of the left lower lobe. The patient was discharged from hospital on March 22, 1955, to a convalescent hospital and was finally discharged on April 9, 1955.

Follow-up.—Twenty months after the injury he had no disability, no depression of the sternum, and his chest expansion was $2^1/_2$ inches. He had returned to his original work.

Case 2.—An electrician, aged 31, was admitted to the Pontefract General Infirmary on Nov. 10, 1956, having been in a head-on collision while driving a motor-car. He had the typical "steering-wheel" injury, with a very obvious paradoxical movement of the anterior part of the upper left chest. He was rather shocked, his respirations were 40 a minute, and breathing was very laboured. Radiography confirmed the clinical impression that the upper five left ribs were fractured, each at two sites anteriorly. It was surprising that there was no damage to the subclavian vessels.

Treatment and Progress.—Zinc-oxide strapping applied to the upper left chest did not improve the paradoxical movement or the pain. Ten hours after the injury the patient was very distressed. Moist sounds in his chest were audible without the use of a stethoscope. There was now much cyanosis, and tracheotomy was done under local anæsthesia with 2% lignocaine. The supine position was extremely distressing to the patient, and the operation was done with some difficulty because of his restless movements. As soon as the tracheotomy tube was inserted, a large amount of bloodstained mucoid secretion was aspirated with the suction catheter. The patient was nursed in the sitting position in a steam tent, with intermittent inhalations of alevaire provided through a nebuliser. Next day his cyanosis had disappeared, he was breathing easily, and, although paradoxical movement was still present, the excursion of the floating segment was much less. Radiography on Nov. 12 showed increased shadowing in the lower half of the left lung field and a pneumothorax estimated at 15%. On Nov. 13 there was an obvious collection of fluid in the left side of the chest, confirmed radiologically, and aspiration through the eighth intercostal space removed 300 ml. of almost pure blood. Next day a further 450 ml. of blood was aspirated, and on the following morning 40 ml. of bloodstained fluid was removed, this latter with some difficulty. Radiography on Nov. 15 showed the upper half of the left chest to be occupied by pneumothorax and the lower half by collapsed lung and effusion. The apex of the lung, however, showed aeration. No further aspirations were done, and serial radiographs showed a rapid re-expansion of the lung and absorption of the pneumothorax and the remaining effusion. By Nov. 23 the paradoxical movement had completely ceased, the respiratory movements were free and painless, and there was good air entry at the left apex. More vigorous breathing exercises were begun. On Nov. 28 the tracheotomy tube was removed without any following discomfort. The patient was discharged from hospital on Dec. 4 symptomless, with a slight depression of the anterior upper left chest but no other physical signs.

At follow-up he had no symptoms, a chest expansion of $3^1/_2$ inches, and had started work.

Summary

Immediate tracheotomy is advocated for crush injuries of the chest causing flail chest.

Physiological arguments, supported by clinical observations, indicate that tracheotomy breaks a vicious circle and produces less paradoxical movement, better pulmonary aeration, less pain, less expenditure of energy, and ease in aspiration of the tracheobronchial tree.

I wish to thank Mr. J. A. Rhind, under whose care these cases were admitted and who advocated this method of treatment, for permission to publish and for advice and encouragement at all times.

REFERENCES

Bailey, H., Matheson, N. M. (1953) Emergency Surgery. 6th ed., Bristol; p. 573.
Belsey, R. (1953) *Practitioner*, **170**, 134.
Bonnin, J. G. (1951) Complete Outline of Fractures. 3rd ed., London; p. 281.
Brewer, L. A., Burbank, B., Samson, P. C., Schiff, C. A. (1946) *Ann. Surg.* **123**, 343.
Brooks, W. D. W. (1942) *In* Conybeare, J. J. Textbook of Medicine, by Various Authors. 6th ed., Edinburgh; p. 468.
Butler, E. (1938) *Surg. Gynec. Obstet.* **66**, 448.
Cameron, D. A., O'Rourke, P. V., Burt, C. W. (1949) *Amer. J. Surg.* **78**, 668.
Carter, B. N., Giuseffi, J. (1951) *J. thorac. Surg.* **21**, 495.
— — (1953) *Surg. Gynec. Obstet.* **96**, 55.
Cato, F. L., Norman, W. D. (1940) *Surgery*, **7**, 848.
Coleman, F. P., Coleman, C. L. (1950) *Surg. Gynec. Obstet.* **90**, 129.
Colvin, E. M., Morrison, W. M. (1953) *Ibid*, **96**, 338.
Coope, R. (1948) Diseases of the Chest. Described for Students and Practitioners. 2nd ed., Edinburgh; p. 478.
Davis, L. (1956) Christopher's Textbook of Surgery. 6th ed., Philadelphia and London; p. 1021.
DeBakey, M. (1942) *Int. Abstr. Surg.* **74**, 203.
Dolley, F. S., Brewer, L. A. (1942) *Ann. Surg.* **116**, 668.
Elkin, D. C., Cooper, F. W. jun. (1943) *Surg. Gynec. Obstet.* **77**, 271.
Gardner, C. E. jun. (1946) *Surg. Clin. N. Amer.* **26**, 1082.
Gray, H. K. (1942) *Proc. Mayo Clin.* **17**, 566.
Guedel, A. E., Waters, R. M. (1928) *Curr. Res. Anesth.* **7**, 238.
Hagen, K. (1945) *J. Bone Jt Surg.* **27**, 330.
Heroy, W. H., Eggleston, F. C. (1951) *Ann. Surg.* **133**, 135.
Jaslow, I. A. (1946) *Amer. J. Surg.* **72**, 753.
Jones, T. B., Richardson, E. P. (1926) *Surg. Gynec. Obstet.* **42**, 283.
McKim, L. H. (1943) *Ann. Surg.* **118**, 158.
Pitman, R. G., Wilson, F. (1955) *Lancet*, ii, 523.
Proctor, H., London, P. S. (1955) *Brit. J. Surg.* **42**, 622.
Rives, J. D., Kahle, H. R. (1939) *Sth. med. J.* **32**, 512.
Sweet, R. H. (1954) Thoracic Surgery. 2nd ed., Philadelphia and London; p. 133.
Watson-Jones, R. (1955) Fractures and Joint Injuries. 4th ed., Edinburgh; p. 928.
Williams, M. H. (1948) *Ann. Surg.* **128**, 1006.
Wise, W. D. (1942) *Surg. Clin. N. Amer.* **22**, 1375.

ENDOCARDIAL FIBROSIS OF UNKNOWN ORIGIN

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ENDOCARDIAL fibrosis can occur in both infants and adults.

In infancy, there is gross thickening of both fibrous and elastic elements in the endocardium, with little or no inflammation or involvement of the myocardium. The condition is known as fibroelastosis or fœtal endocarditis; and, though its origin is obscure, Still and Boult (1956), using electron microscopy, have recently demonstrated superficial deposition of fibrin.

In adults idiopathic endocardial or endomyocardial fibrosis is generally rare, but may be common in Africa

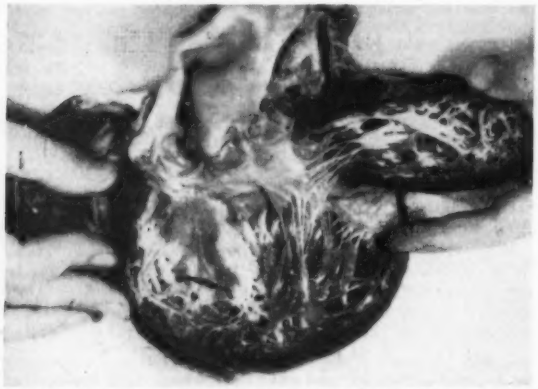

Fig. 1—Interior of ventricles showing patchy endocardial fibrosis. The myocardium is not involved.

(Ball et al. 1954). It differs from infantile fibroelastosis in appearance and does not seem to be so well-defined. Descriptions vary, but there is usually an increase in fibrous tissue in the endocardium and to a varying extent in the neighbouring myocardium. The elastic tissue is ordinarily unaffected, and there is little or no inflammatory reaction.

In the following case of the adult type, the notable features were the history of possible injury to the heart, the patchiness of the fibrosis, and the absence of elastosis and of involvement of the myocardium.

Case-report

Mr. A, a journalist aged 67, was admitted in March, 1956, with increasing breathlessness for two months.

In 1914, whilst playing cricket abroad, he was hit "on the heart" by the ball. He immediately fell unconscious to the ground and lay there for five minutes. Spectators thought he was dead. A foreign doctor who saw him diagnosed "concussion of the heart" and treated him with an electric instrument over the precordium.

He served in the Middle East and Gallipoli in the 1914–18 war, and apart from an attack of "malaria" ten years after his return home, he was well until October, 1954. At that time he had a "strained heart" and nocturnal frequency, and was admitted to hospital. The heart appeared slightly enlarged, pulse-rate 84, blood-pressure (B.P.) 160/95 mm. Hg. The heart-sounds were normal and there was no dyspnœa or œdema. Urinary investigations showed an enlarged prostate and a slight left hydronephrosis.

In January, 1955, he had another attack of "heart strain," but he was not admitted to hospital.

Last Illness

History.—Three months before admission he had become increasingly breathless. During the previous three weeks his ankles had swollen and he had had an occasional hæmoptysis; for two days he had been cyanosed and very breathless, and had vomited frequently.

He ate a normal diet and had no allergy. He had never been to Africa, apart from war service in Egypt.

Examination.—He was a well-nourished man with severe congestive heart-failure. He had auricular fibrillation with a ventricular rate of 120 a minute. A harsh systolic murmur was heard over the whole cardiac area. The apex-beat was 5 in. from the midline in the 6th space; B.P. 110/80. A blood-count showed a slight polymorphonuclear leucocytosis. Total white-cell count 14,600 per c.mm. (polymorphs 82%, eosinophils nil).

Congestive heart-failure of unknown origin was diagnosed. He died eight days after admission with increasing failure.

Necropsy

Nourishment.—Good.

Cardiovascular system.—Signs of congestive failure were present. The heart was enlarged (weight 405 g.), mainly because the ventricles were dilated. The aorta and coronary arteries were singularly free of atheroma. The pericardium, myocardium, and valves appeared normal, but there were several small mural antemortem thrombi in the right auricle. There was a patchy irregular superficial thickening of the endocardium of the left ventricle. The myocardium was not involved (fig. 1).

A small infarct was found in the lower lobe of the left lung, with an embolus or possibly a thrombus in the appropriate branch of the pulmonary artery. There were a few small acute ulcers on the lesser curve of the stomach near the pylorus, with 3 oz. of free fresh blood in the lumen. An old infarct (2 × 1 × 1 in.) was present in the *spleen*. Benign enlargement of the *prostate gland*, a large thin-walled *bladder*, and bilateral hydronephroses were found.

Histology

There was a thick patchy fibrous deposit in the endocardium containing fine fatty granules, but with little or no proliferation of elastic tissue. The myocardium was normal except for some large nuclei (fig. 2).

Discussion

Fibrosis of the parietal endocardium of obscure origin can occur in infancy, childhood, and adult life. The

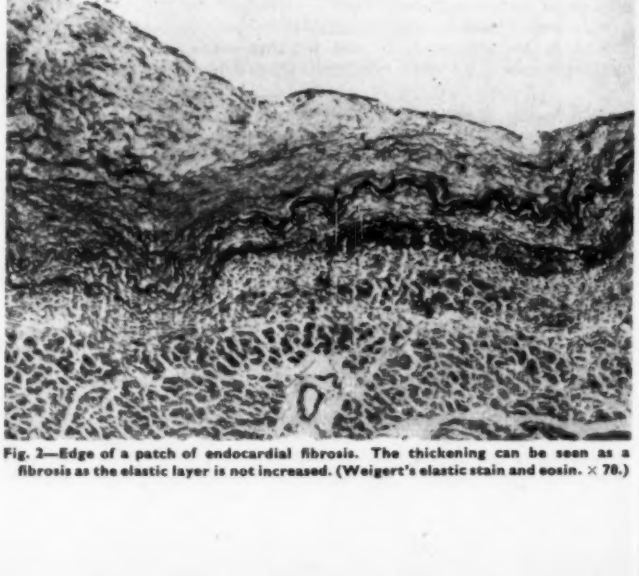

Fig. 2—Edge of a patch of endocardial fibrosis. The thickening can be seen as a fibrosis as the elastic layer is not increased. (Weigert's elastic stain and eosin. × 76.)

fibroelastosis of infancy is probably distinct from the fibrosis of childhood and adult life, but Thomas et al. (1954) suggest that they have a common ætiology. Using Verhoeff's elastic tissue stain, they found in their adult cases that the thickening of the endocardium was a fibroelastosis. They also tested some of the endocardia from the adult cases reported by Davies and Ball (1955) from Uganda, and found only a few broken elastic fibres; they suggested that each of the two series had a different ætiology. The question whether the adult type is a fibrosis or a fibroelastosis is important ætiologically. In the case reported here there appeared to be a pure fibrosis of the endocardium, with no increase in elastic tissue and little or no involvement of the myocardium.

Despite a long search, no reports of adult endocardial or endomyocardial fibrosis in Britain have been found, but recently Watt and Lynch (1956) described a case of endomyocardial fibroelastosis in a boy of 12. Lennox (1948) reported a case in which a woman had a parietal endocarditis with swollen and pyknotic endothelial cells and infiltration of lymphocytes and polymorphs; the myocardium was œdematous. She had status asthmaticus and eosinophilia, and Lennox suggested that the condition might have proceeded to fibrosis had she lived.

Adult endocardial and endomyocardial fibrosis, though uncommon, has been known for many years, particularly to the German and Swiss pathologists. It was reported briefly as early as 1883 (Nauwerk) and at intervals up to 1936—e.g., Kockel 1897, Nagayo 1909, Dewitzky 1911–12, Hertel 1921, Böger 1929. In 1936 Löffler described 2 cases as endocarditis parietalis fibroplastica with eosinophilia. Since then three large series have been reported from Africa—40 cases by Bedford and Konstam (1946), 40 by Becker et al. (1953), and 31 by Davies and Ball (1955), who gave an excellent detailed description of the pathology of the condition. On the whole the evidence favours a nutritional cause for the African cases, but Becker et al. (1953) suggested it was a collagen disease. Gray (1951) described 2 cases in Englishmen living in Nigeria and advanced the idea that as there was no nutritional deficiency in his cases and it was commonest in Africa, it might be due to a tropical infection. A similar case in an Englishman resident in Africa who had syphilis was reported by Edge (1946).

Apart from the African series, small numbers have been reported from Switzerland, Germany, Austria (e.g., Mumme 1940, Büchler 1941–42, Fossel 1942, Egger 1944, Roulet 1944, Berblinger 1948), and America (e.g., Comeau 1937, McKusick and Cochran 1952, Smith and Furth 1943, Thomas et al. 1954).

The pathological picture in the cases reported is by no means uniform, but a general composite picture can be made up.

The patient is usually a man, young or middle-aged rather than old (though the condition has been described in a man aged 71). The heart is usually normal in size, but it is occasionally enlarged with dilatation of the ventricles rather than hypertrophy. Very occasionally the enlargement is massive. The pericardium and coronary arteries are normal. The mural endocardium is thickened either in a sheet-like manner or in plaques. It is usually white or greyish-white. The thickness varies but can be up to 4 mm., or rarely so great that the lumen of the chamber is largely obliterated. The left ventricle is most often affected, then the right ventricle, and only occasionally the auricles. The commonest site seems to be the posterior wall, and the least common the interventricular septum. The mitral and tricuspid valves are sometimes involved, probably by extension from the walls, but the semilunar valves are always free. The nature of the thickening is still not clear.

The majority of reports describe the condition as a fibrosis, others as a fibroelastosis. Commonly there is no inflammatory reaction, but in many of the African cases there is a deep layer resembling granulation tissue. In the myocardium adjacent to the endocardium, there is commonly muscular degeneration and an extension of the fibrosis; more rarely these changes are seen throughout the myocardium. In many cases, possibly those of milder type, only the endocardium is affected. Inflammatory reaction in the myocardium is uncommon but occasionally small collections of small round cells are seen. Polymorphs are noticeably absent.

Thrombus formation on the endocardial fibrosis is very common and embolism is rarer than would be expected. Other lesions found at different times elsewhere in the body include infarcts, signs of malnutrition, allergic and collagen disorders, and eosinophilia in the peripheral blood. Löffler (1936) first described the eosinophilia and suggested that it died out as the disease progressed. The case presented here showed only some of these features, as do the majority of cases. The full picture is rare.

The ætiology is obscure, but there have been many suggested causes, such as malnutrition or defective absorption (Smith and Furth 1943), allergy (Löffler 1936, Lennox 1948), Fiedler's myocarditis (Bedford and Konstam 1946), tropical infection (Gray 1951), syphilis or antisyphilitic treatment (Edge 1946), extension of the infantile type to adult life (Thomas et al. 1954), collagen disease (Becker et al. 1953, Watt and Lynch 1956), pulmonary disease (Lenègre and Gerbaux 1952), stretching of endocardium in cardiac hypertrophy (Hertel 1921), and initial myocardial disease, virus myocarditis, or direct injury (Davies and Ball 1955). It is generally agreed that rheumatism and ischæmia do not cause this disease. The only obvious cause in my patient was a presumed injury to the heart, when he was struck in the precordial region by a cricket-ball. I should like to advance the view, apparently so far unexpressed, that endocardial fibrosis is the end-result of damage to the endocardium irrespective of the nature of the damage. Endomyocardial fibrosis might then be regarded as the final result of more severe damage or as the end stage where both the myocardium and endocardium have been damaged.

The nature of the process is still obscure, but if the above hypothesis is accepted, the course of the disease might follow lines similar to those put forward by Duguid (1946, 1949) for the formation of atherosclerosis.

Briefly, Duguid's hypothesis is that fibrin deposits are laid down on the arterial intima and that these are incorporated in the intima by organisation with a final covering of endothelium. The recent paper by Still and Boult (1956) suggests that a similar process may occur in infantile fibroelastosis.

The sequence of events in adult endocardial fibrosis would then be (*a*) damage to the endocardium by one of many possible factors; (*b*) deposition of fibrin on the affected areas; and (*c*) organisation of the thrombi and incorporation in the endocardium as an apparent fibrosis.

Summary

A case of adult mural endocardial fibrosis is presented with the necropsy findings. Its pathology, ætiology, and nature is discussed. It is suggested that it is the end-result of any damage to the endocardium and that the mechanism might accord with Duguid's hypothesis on the formation of atheroma.

My thanks are due to Dr. S. A. Propert for permission to publish the case, to Dr. P. G. Seear for details of the patient's history, to Dr. L. W. Proger for his help and advice, and to Dr. J. W. Nicholas for the photograph of the specimen.

REFERENCES

Ball, J. D., Williams, A. W., Davies, J. N. P. (1954) *Lancet*, i, 1049.
Becker, B. J. P., Chatgidakis, C. B., van Lingen, B. (1953) *Circulation*, **7**, 345.
Bedford, D. E., Konstam, G. L. S. (1946) *Brit. Heart J.* **8**, 236.
Berblinger, W. (1948) *Schweiz. med. Wschr.* **78**, 829.
Böger, A. (1929) *Beitr. path. Anat.* **81**, 441.
Büchler, H. (1941–42) *Z. klin. Med.* **140**, 56.

References continued overleaf

SERUM-POTASSIUM LEVELS AS AN INDEX OF BODY CONTENT

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IN acute experimental depletion of potassium the serum-potassium level may show a relationship to the extent of the depletion (Black 1953). In clinical practice, however, not all depletion arises acutely. Moreover a rise in the serum-potassium level at a time of acute loss of potassium has been reported (Moore et al. 1955).

We present here the results of 110 simultaneous observations of total exchangeable body-potassium and serum-potassium levels in patients with various complaints, mostly either congestive heart-failure or steatorrhœa.

Methods

The methods used for determining exchangeable body-potassium have been detailed elsewhere (Blainey et al. 1954, Flear et al. 1957). The serum-potassium levels were determined with the 'Eel' direct-reading flame-photometer.

Results

Table I shows the distribution of the observations and diagnoses. Only the patients with congestive heart-failure clinically were œdematous. In the accompanying figure the serum-potassium levels are plotted against the amounts of total exchangeable potassium in absolute terms and in relation to weight and to height. In each case the values are expressed as percentages of the mean normal values computed from published reports (Flear et al. 1957).

Discussion

The method used estimates the amount of potassium in the body which has exchanged with its radioactive isotope ^{42}K from twenty-four to thirty-two hours after its injection. This total exchangeable mass of potassium (K_e) may be the whole of the body-potassium (Corsa et al. 1950), but Rundo and Sagild (1955) have considered it to be significantly less. They estimated the total body-potassium from the total gamma-count emitted by the body. In people not exposed to radioactive materials this has been attributed solely to the naturally occurring isotope ^{40}K, and the total body-potassium can be computed from the ratio in which ^{40}K is found to ^{39}K. Total body-potassium was about 15% more than K_e. Theoretically this potassium might be either completely unexchangeable or might exchange at a much slower rate. We did not detect any further exchange during the eight hours following the first twenty-four after injection of ^{42}K (Flear et al. 1957); nor did we detect any further exchange during this period between the body-sodium and ^{24}Na, though studies using the longer-life isotope ^{22}Na (Veall et al. 1955) have revealed a slow further exchange requiring several days for completion. Whether a similar slow exchange exists with potassium is unknown. However, whichever possibility is correct, K_e probably represents the fraction of body-potassium more readily available for metabolic interchanges.

The amount of potassium present in the extracellular fluid of the body constitutes only about 2% of the value obtained for K_e. Effectively, then, changes in K_e will reflect changes in intracellular potassium. The exchangeable mass of potassium has therefore been used to assess the state of the body-potassium, more particularly the extent of any intracellular depletion. Its use is, however, open to certain criticisms. Firstly, there is the practical difficulty of the variation in K_e which occurs from individual to individual and from day to day within any individual. This variability between individuals to some extent may be mitigated by the separate consideration of males and females and by reference to body-weight or to height, on the general principles that the sexes reasonably may be expected to show differences of body content, and that the size of the individual may be a factor involved. Sagild (1956) has shown that K_e per kg. of body-weight varies with age.

Change in K_e may take place from a reduction in the amount of potassium within cells or from a reduction in the number of cells. The former constitutes cellular depletion of potassium, and the latter represents loss of tissue mass. Loss of potassium from cells causes a fall in K_e per kg., whereas loss of lean tissue does not. However, these two factors may not be wholly independent. It is known, for instance, that experimental depletion of potassium leads to a secondary loss of lean tissue. The value of K_e per kg. may therefore not fully represent the real depletion of potassium. Furthermore, the value for K_e per kg. of body-weight is altered by change in body composition other than loss of potassium

TABLE I—DISTRIBUTION BY DIAGNOSIS OF PAIRED OBSERVATIONS OF TOTAL EXCHANGEABLE MASS OF POTASSIUM (K_e) AND SERUM-POTASSIUM LEVELS

Diagnosis	No. of patients	No. of observations
Steatorrhœa:		
Idiopathic	21	31
Whipples	2	7
Crohns	3	4
Pancreatogenous	3	4
Ileo-colitis	2	2
Postgastrectomy	2	2
Reticulosis	1	1
Gastrocolic fistula	1	1
Colostomy	1	1
Ileocolostomy	1	1
Peptic ulcer	4	4
Congestive heart-failure with œdema	21	29
Addison's disease	1	3
Chronic bronchitis	2	3
Healed pulmonary tuberculosis	2	2
Carcinoma of bronchus	1	2
Alkalosis	1	2
Cirrhosis	2	2
Macrocytic anæmia	1	1
Anxiety state	1	1
Headaches	1	1
Nephrocalcinosis	1	1
Arteriosclerosis	1	1
Hypertension	1	1
Bronchiectasis	1	1
Idiopathic hypoproteinæmia	1	1
Chronic ulcer of leg	1	1

DR. PENFOLD : REFERENCES—*continued*

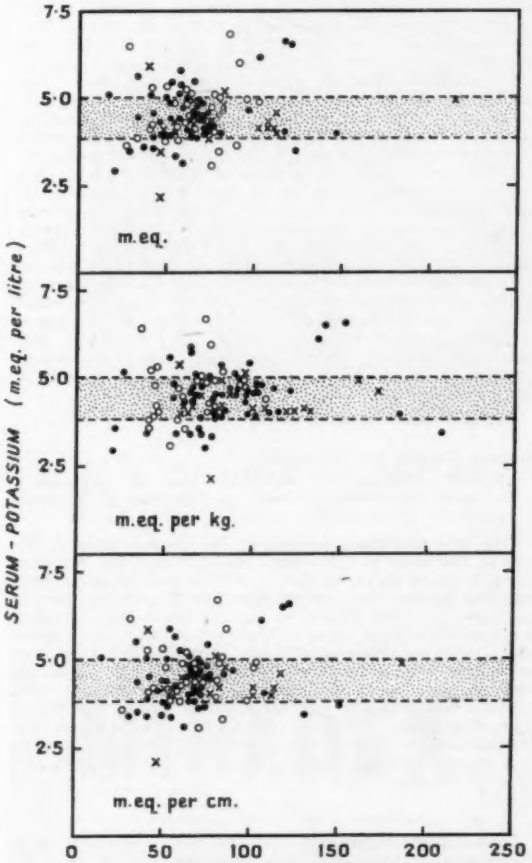
Comeau, W. J. (1937) *Amer. J. Path.* **13**, 277.
Davies, J. N. P., Ball, J. D. (1955) *Brit. Heart J.* **17**, 337.
Dewitzky, W. (1911–12) *Frankfurt. Z. Path.* **9**, 82.
Duguid, J. B. (1946) *J. Path. Bact.* **58**, 207.
— (1949) *Lancet*, ii, 925.
Edge, J. R. (1946) *Ibid*, ii, 675.
Egger, P. (1944) *Schweiz. Z. Path.* **7**, 237.
Fossel, M. (1942) *Beitr. Path. Anat.* **107**, 241.
Gray, I. R. (1951) *Brit. Heart J.* **13**, 387.
Hertel, M. P. (1921) *Frankfurt. Z. Path.* **24**, 1.
Kockel (1897) *Schmidts Jb.* **253**, 270.
Lenègre, J., Gerbaux, A. (1952) *Arch. mal. Coeur*, **45**, 289.
Lennox, B. (1948) *J. Path. Bact.* **60**, 621.
Löffler, W. (1936) *Schweiz. med. Wschr.* **66**, 817.
McKusick, V. A., Cochran, T. H. (1952) *Bull. Johns Hopk. Hosp.* **90**, 90.
Mumme, C. (1940) *Z. klin. Med.* **138**, 22.
Nagayo, M. (1909) *Beitr. path. Anat.* **45**, 283.
Nauwerk, C. (1883) *Dtsch. Arch. klin. Med.* **33**, 210.
Roulet, F. (1944) *Schweiz. med. Wschr.* **74**, 427.
Smith, J. J., Furth, J. (1943) *Arch. intern. Med.* **71**, 602.
Still, W. J. S., Boult, E. H. (1956) *Lancet*, ii, 117.
Thomas, W. A., Randall, R. V., Bland, E. F., Castleman, E. (1954) *New Engl. J. Med.* **251**, 327.
Watt, J., Lynch, J. B. (1956) *Lancet*, i, 658.

from cells. It cannot, therefore, be relied on by itself to afford a clear index of the normality of intracellular potassium. It is necessary also to consider the absolute value for K_e and the value for K_e per cm. of body-height.

Among changes in body composition influencing the value for K_e per kg. may be listed gain or loss of body-fat and gain or loss of extracellular and intracellular fluids in œdematous states and dehydration respectively. The qualitative consequence of such changes in composition on K_e (absolute and when referred to body-weight and height) are detailed in table II. Such changes in composition may arise singly or in combination. Table II focuses attention on the difficulties which arise in interpreting the value for K_e in any one individual, even when all three parameters are used.

There is a further complicating factor, at least theoretically possible—i.e., the proportion of body-potassium not exchangeable with ^{42}K within twenty-four hours might vary. This possibility is raised by the observation reported by Rundo and Sagild (1955) but will not be considered further here.

Using K_e as an index of depletion of body-potassium one can say that our data do not reveal any relation between it and the serum-potassium level. This is so when considered in absolute terms and when standardised to height or to weight. Our data thus confirm those of Moore et al. (1954) but over a somewhat greater range



Distribution of total exchangeable body-potassium and serum-potassium levels in 110 patients with various diseases: O, congestive heart-failure; ●, steatorrhœa; X, miscellaneous.

TABLE II—EFFECT OF SOME CHANGES IN BODY COMPOSITION ON ABSOLUTE VALUES FOR TOTAL EXCHANGEABLE MASS OF POTASSIUM AND VALUES REFERRED TO HEIGHT AND WEIGHT

Changes in body composition	Changes in total exchangeable mass of potassium		
	m.eq.	m.eq. per kg.	m.eq. per cm.
Loss of potassium from cells	Decrease	Decrease	Decrease
Gain of intracellular and/or extracellular water—œdema	No change	Decrease	No change
Loss of intracellular and/or extracellular water and salts:			
Including potassium ..	Decrease	No change	Decrease
Excluding potassium ..	No change	Increase	No change
Loss of lean tissue	Decrease	No change	Decrease
Loss of fat	No change	Increase	No change
Gain of fat	No change	Decrease	No change

of variation in K_e. (Our range of variation was K_e 16–123%, K_e per kg. 27–142%, and K_e per cm. 16–123%. Their range was K_e 39–101% and K_e per kg. 50–102%.) The observations of these workers were made on patients with either renal, alimentary-tract, or cardiovascular disease. High potassium levels may be found in the presence of low values for K_e showing that such high levels do not imply a normal or raised amount of body-potassium. Conversely, a low serum-potassium level need not imply depletion of potassium.

These findings are not surprising, because it is well known that the amount of intracellular potassium is far from being a passive consequence of the serum-potassium level. Conversely, many factors other than the amount of intracellular potassium influence the amount of extracellular potassium. Among these factors are rates of tissue katabolism, renal function, acid/base balance, intake of potassium, extracellular fluid volume, and cellular metabolism.

In clinical practice the question whether or not a patient is deficient in potassium often arises. Evidence from balance data, muscle biopsy, or radio-isotopes is rarely available. Our data clearly indicate that emphasis should not be placed on the serum-potassium level; moreover the symptoms which may accompany such depletion are not pathognomonic and may vary. Accordingly the diagnosis of potassium depletion should be based firstly upon a recognition of circumstances which, from experimental and clinical studies, may be anticipated to lead to a loss of potassium from the body, and only secondly upon clinical signs and symptoms and biochemical findings consistent with its presence.

Summary

110 observations of exchangeable body-potassium and serum-potassium levels are presented which do not show any correlation between them.

Clinical awareness of the circumstances likely to lead to potassium depletion is the most important factor in its diagnosis. Clinical symptoms and signs and serum-biochemical findings are of secondary importance.

We wish to thank the physicians at the Queen Elizabeth and General Hospitals for allowing us to investigate patients under their care, and the ward sisters for their coöperation in these studies.

REFERENCES

Black, D. A. K. (1953) *Lancet*, i, 305, 353.
Blainey, J. D., Cooke, W. T., Quinton, A., Scott, K. W. (1954) *Clin. Sci.* **13**, 165.
Corsa, L. jun., Olney, J. M., Steenberg, R. W., Ball, M. R., Moore, F. D. (1950) *J. clin. Invest.* **29**, 1280.
Flear, C. T. G., Cawley, R., Quinton, A., Cooke, W. T. (1957) *Clin. Sci.* (in the press).
Moore, F. D., Edelman, I. S., Olney, J. M., James, A. H., Brooks, L., Wilson, G. M. (1954) *Metabolism*, **3**, 334.
— Steenberg, R. W., Ball, M. R., Wilson, G. M., Myrden, J. A. (1955) *Ann. Surg.* **141**, 145.
Rundo, J., Sagild, U. (1955) *Nature, Lond.* **175**, 774.
Sagild, U. (1956) *Scand. J. clin. Lab. Invest.* **8**, 44.
Veall, N., Fisher, H. J., Brown, J. C. M., Bradley, J. E. S. (1955) *Lancet*, i, 419.

Medical Societies

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE

Disorders due to Heat

AT a meeting of this society on Feb. 21, Dr. W. S. S. LADELL, who was recently in charge of the Hot Climates Physiological Research Unit, Lagos, Nigeria, read a paper on Disorders due to Heat.

He divided these into four parts: skin disorders (sunburn and prickly heat); circulatory disorders (heat syncope); disorders of water and electrolyte metabolism (heat exhaustion, heat cramps); failures of heat regulation (tropical anidrotic asthenia, hyperpyrexia).

Heat exhaustion and heat cramps are probably due to the strain of extra effort in a person chronically slightly short of water. At one time salt deficiency was thought to be the major factor, but Ladell now thinks that water debt—in people who consistently do not drink enough—is the predisposing cause. Extracellular fluid is lost in the heat, and about 2 litres can be lost before the intracellular water is affected, but the loss of much of the extracellular water renders the person susceptible to heat exhaustion; depletion of intracellular water is dangerous.

The rôle of salt is complex. In the state of water debt, if water is taken but no salt the intracellular fluid is maintained, and any deficit falls on the extracellular fluid; if salt is taken, particularly in the absence of enough water, the intracellular-fluid volume falls, and the extracellular-fluid volume is maintained at the expense of the intracellular fluid. This intracellular dehydration leads to collapse. Treatment consists of plenty of water and a controlled supply of salt; excess of salt will deplete the intracellular fluid and make the patient worse. Therefore, in persons in chronic slight water debt, unless there is a sudden emergency calling for an extra output of sweat, extra salt should not be taken; and if any extra salt is taken ample water should be drunk. Extra salt may also depress aldosterone secretion, and this may be dangerous. Ladell thinks that man has become addicted to salt as a habit, not as a necessity in the amounts normally consumed.

Tropical anidrotic asthenia is seen at the end of the hot season; there is no collapse but there is lack of energy, failure to sweat properly, and polyuria. The symptoms may be explained first by failure of the renal tubules to respond to antidiuretic hormone, which leads to excessive production of that hormone, and this may suppress sweating. Secondly, there is diminished activity by the adrenal cortex, which leads to electrolyte imbalance and asthenia. The condition is often associated with prickly heat or lichen tropicalis. The only satisfactory treatment is prolonged rest in the cool.

Ladell's conception of heat hyperpyrexia is that it is essentially a physiological, not a pathological, process. Its ætiology is not clearly known, but it may have an affinity with "sweat-gland fatigue" (which, being reversible, is not true fatigue). Experiments have shown that the response of the sweat-glands in the healthy person becomes progressively less as the rectal temperature rises, and a critical point can be reached (for instance, after hard work in the heat or if physiological cooling is prevented as by the wearing of too much clothing or lack of ventilation) at which sweating stops and cooling ceases, with rapid—and, without treatment, fatal—results. Treatment consists in cooling by means of tepid sponging, wrapping the patient in wet towels, and the use of fans for evaporation.

Lieut.-Colonel J. H. WALTERS cited a series of cases of heat hyperpyrexia seen in Iraq and Kuwait. Some of the patients were middle-aged pilgrims or fat cooks, subject to great heat stress, and some were men with arsenical dermatitis after treatment for syphilis; in the latter sweating was inhibited. There may be an element of acute anoxia in heat hyperpyrexia, which may indicate the use of oxygen in treatment. In some patients who recovered there was evidence of serious damage to the nervous system.

Major-General A. SACHS recalled the pathological findings in hyperpyrexia, with hæmorrhages into the suprarenals and cerebellum and circulatory collapse.

Reviews of Books

The Nature of Brucellosis

WESLEY W. SPINK, M.D., D.SC., professor of medicine at the University of Minnesota. Minneapolis: Minnesota University Press. London: Oxford University Press. 1956. Pp. 464. 63*s*.

THIS book gives an up-to-date account of brucella infection ("undulant fever") in man, founded upon a series of 244 cases seen at the University of Minnesota Hospitals.

The first part gives a good summary of the history of brucella infection in animals and man, the characters and methods of differentiating the three varieties of brucella, and the natural history of the disease in the animal hosts. The author has made a special study of this disease over the past seventeen years, and his cases, each of which he summarises, were thoroughly investigated and carefully treated. His handling of the difficult problem of so-called "chronic brucellosis" is particularly good, though more attention might have been paid to those cases in which a very short and sometimes afebrile acute attack, which is usually regarded at the time as a "cold," is followed by chronic ill health that is eventually shown by culture or blood agglutination to be due to brucella infection. Greater emphasis might have been placed on the value of a negative intradermal test in excluding brucellosis. The clinical picture of the Minnesota cases differs considerably (and rather unexpectedly, as they were all due to the abortus variety of the organism) from the English cases reported by Dalrymple-Champneys. In the Minnesota cases rigors were much commoner; spondylitis was the commonest complication, which was not so in the English series; and unlike the English cases, a majority were occupational infections, 55% of the patients being employed in a local meat-packing plant.

This is a most valuable work.

Modern Trends in Geriatrics

Edited by WILLIAM HOBSON, B.SC., M.D., D.P.H., professor of social and industrial medicine, University of Sheffield. London: Butterworth. 1956. Pp. 422. 72*s*. 6*d*.

THIS is a welcome addition to British accounts of the care of the elderly. Professor Hobson and his eighteen fellow authors have written a textbook with some outstanding merits. By careful selection of material, proper emphasis has been placed on aspects where principle and practice differ from those in the care of younger people: many of the contributors are not geriatricians but specialists who realise that geriatrics involves problems that concern many different specialties. As the title implies, this work is not intended to cover the whole field of geriatric medicine; but it could be made the foundation of a reference volume comparable to the well-known American books edited by E. J. Stieglitz and by A. I. Lansing.

Pathological Histology (5th ed. Edinburgh: E. & S. Livingstone. 1957. Pp. 468. 52*s*. 6*d*.).—This work by Dr. R. F. Ogilvie has established itself as a standard textbook. For the new edition many photomicrographs have been replaced and the text has been rewritten and amplified, but the over-all length has been reduced.

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THE LANCET

LONDON: SATURDAY, MARCH 2, 1957

Government and Profession

INDIGNATION was justified. In the twelve months since National Health Service doctors outlined their case for a rise of pay,[1] the Government had refused to discuss its merits but had kept the negotiations in play. Then, without any kind of warning or consultation, they announced that the whole subject of medical and dental remuneration is to go to a Royal Commission—a form of inquiry which takes a very long time. Members of our profession who would not wish to press their claim at a moment of special economic difficulty were affronted by a decision which postponed that claim indefinitely and looked as though it were intended to absolve this particular Government of any further responsibility for action—except on the pay of junior hospital doctors. Happily the PRIME MINISTER's reply on Monday to Sir RUSSELL BRAIN and Dr. TALBOT ROGERS implies that the need for an interim settlement is now recognised.

The Government, of course, have their own point of view. In this country recovery from the war has not gone far enough to make everyone better off than before, and the attempt to create a more healthy society, without gross poverty, has necessitated a redistribution of real income which has hit many people very hard. Among those now less well-to-do are most of the professional classes (unless attached to industry); for their earnings have seldom risen enough to make up for the fall in the value of money, and the full force of taxation hits them at a level of purchasing-power which gets lower and lower. Responsible elements in both political parties regret the narrowing and impoverishment of professional life thus caused: Labour, with its special concern for the success of the nationalised industries and services, should have no wish to drive good brains abroad, while the Conservatives obviously think that redistribution of wealth has gone too far. But the remedies, though easy to prescribe, are difficult to apply. The three means by which the professional lot could be alleviated are reduction of taxation, increase in pay, and halting of inflation. Nobody can doubt that Mr. MACMILLAN's Government will reduce direct taxation as soon as they dare; but they cannot yet look to much relief on Defence, and meanwhile they have to provide for higher expenditure elsewhere—this year's estimate for the National Health Service, for example, being £49 million more than last year's.[2] Though members of some professions could certainly be helped by giving more to those on the public pay-roll, a Chancellor of of the Exchequer who wants to reduce taxes is understandably loth to add, for instance, £20 million for doctors to the £550 million which taxpayers will have to find for the N.H.S. next year—especially perhaps when he is still under fire for raising only twice that sum by adding 10*d.* to the National Insurance contribution. Thirdly, a Government can undertake more radical but painful treatment to stop the inflation which is responsible for so many of our symptoms; and if they can show that they are really trying to do this they are entitled to ask for the patient's coöperation. Having incurred, to this end, the unpopularity of the credit squeeze, the present Government will naturally be inclined to turn its deafer ear to any small group which is not only asking for a lot of money but also (it may seem) for a privileged economic position.

Granted, however, that a Government's duty is to govern—that they deserve no respect unless they can say "No" to their friends—strength of purpose does not excuse unfairness. What has been unfair about the attitude of successive Governments is that in seeking economies they have expected a special contribution from people who get their livelihood from public funds: when the Civil Servant or the person working in some national undertaking is denied the proper rate for the job, because the Government "cannot afford it," he is in fact being forced to make an additional contribution to the Exchequer, supplementary to what he pays in taxes; and the same is true of the doctor who is asked to accept uncompensated depreciation of his income when (even in the National Health Service itself) the need for compensation of other groups is freely recognised.[3] What is unjust is also in the long run unwise, and grave damage to the service will be averted only if the Government demonstrate that they are not as uninterested or as cynical as they appeared. Particularly in a new service such as the N.H.S., confidence is vitally important; and we trust they will be able to restore it quickly by immediate concessions which reasonable people will find acceptable. Thereafter it might be possible for the Royal Commission to plan its work with a view to a fairly early interim report on the general level of medical and dental remuneration and how this should be maintained.

What, it is asked, should be the profession's attitude towards the Royal Commission? Apart altogether from delay, two objections to its appointment have been raised. First there is the "melting-pot" objection: everything (it is rightly said) will have to be considered afresh—from mileage to merit awards—and Spens will be superseded by a report carrying higher authority. We admit that in this melting process something may be lost, but we think it at least equally likely that something will be gained—including, possibly, improvements on some of the present methods of remuneration. Good though they were, the Spens reports were incomplete and not entirely consistent, and for our part we have long wished to see them reconsidered so that N.H.S. remuneration should be set on a properly agreed base.[4] When it comes to the point, no responsible inquiry can ignore the terms on which doctors entered the service, and the case for preserving the doctor's accustomed place in the community seems to us so strong that it can safely be entrusted to the judgment of sensible people such as usually sit on Royal Commissions. After all,

1. *Lancet*, 1956, i, 277.
2. See p. 474.
3. See *Lancet*, Feb. 2, 1957, p. 258.
4. *Ibid*, 1954, i, 1277.

at worst, when the commission has reported, the profession will be entitled, if it wishes, to hold to the letter of the bargains it reached with the Government in 1946 and 1948. It will be uncommitted by what the commission says. So too, of course, will be the Government; and it is the Government's freedom to pay no attention to the commission's report that is the other big objection raised to the present plan. The outcome here, we believe, depends largely on public opinion. Even among other professional people, the response to the present medical claim has been distinctly ambivalent; and, so far from being thanked for giving a lead, our profession is often held to be taking a selfish line. One reason for this is that, intent on their present wrongs, doctors have sometimes seemed to underestimate the difficulties of many other professional people, which may be at least as serious. According to the *Financial Times*,[5] the "average" practitioner with a wife and two children, earning £938 in 1938 and £2222 in 1956, has sustained a loss of real income (after paying taxes) of 27%. But the university professor (arts) runs him close at 24%, and the estimated loss of the headmaster of a large grammar school and of the assistant secretary in the Civil Service are higher at 32% and 43% respectively. As for the general public—many of whom still think that the whole of their weekly National Insurance contribution goes straight into their family physician's pocket—they do not readily understand how doctors justify an average "wage claim" for an additional £10 a week, which is more than many of them earn altogether. They would feel differently perhaps if they saw the calculation [6] that for consultation or visit the doctor now gets an average of half a crown. Perhaps no completely satisfactory arrangements can be made until the public, as well as the Government, understand that they cannot continue to have really good doctors unless they are prepared to pay for really good doctors.

But we would add that the future of the profession ultimately depends not on what the public think, or on what the Government say, but on what the profession itself does; and, since the immediate outlook remains uncertain, we must state our opinion of the current proposal that professional action should take the form of pressure on the Government through an undertaking by practitioners to withdraw from the National Health Service. In our view this proposal is wrong: we think that even if it were 100% successful such action would still do great harm to the profession—more harm than could be done by any Government. In offering this opinion we do not mean that doctors need remain in a service in which they lose confidence: we think that those who, now or later, want to leave the N.H.S. should certainly do so; and we agree that if any substantial exodus were in prospect the professional organisations would need to do all they could to help both their members and the public to overcome the difficulties thus arising. But a genuine decision by individual doctors to return to private practice would be quite different from a withdrawal, or the threat of a withdrawal, organised for political ends. This we regard as an alien procedure, out of keeping with the character of any profession, and especially that of medicine.

5. *Financial Times*, Feb. 22, 1957, pp. 1 and 6.
6. Cardew, B. *Times*, Feb. 16, 1957.

Hypophosphatasia

IN 1948 RATHBUN [1] drew attention to an osteodystrophy in infants which resembled severe rickets in many respects, but in which there was a great reduction in the level of serum-alkaline-phosphatase activity: he called the syndrome hypophosphatasia. Further reports have appeared of what appears to be the same disorder, and a clearer picture of this remarkable new bone disease is beginning to emerge.

The disorder may be clinically apparent at birth or soon afterwards. RATHBUN's patient was 3 weeks old when first admitted to hospital, with multiple abnormalities and defective mineralisation of the skeleton; and MCCANCE et al.[2] have lately described an infant who was certainly affected at birth and who had indeed been recognised as abnormal in utero by X-ray examination. At birth the bony cranium was very poorly developed and there were widely patent and communicating fontanelles. The chest was flattened at the sides, and beading of the costochondral junctions could be felt. The lower ends of the forearms were much widened, and the long bones were soft and easily bent. An older sister had been shown to have the same condition, from which she had died at 14 weeks. But by no means all cases are apparent as early as this: ENGFELDT and ZETTERSTRÖM's patient [3] seemed to have developed quite satisfactorily until she was 3 months old; then a failure to thrive and the generalised skeletal disorder resembling rickets first became apparent. SOBEL et al.'s patient [4] had evidently progressed well during the first year of life and medical advice was not sought till she was 19 months old. During the preceding 2 months several teeth had been shed, and increasing rickety deformities of the limbs had developed. A similar variation in the age of apparent onset is seen in the three hypophosphatasic children described by SCHLESINGER et al.[5] Two brothers, aged 10 and 13, were admitted to hospital for orthopædic correction of genu valgum and were found to have very low levels of serum-alkaline-phosphatase [6]; they probably had an even milder form of the condition. When the disease appears in infancy the outstanding features are failure to thrive, early rachitic-type bone deformities, and very poor calcification of the skeleton. The fontanelle is often tense and bulging, though the cause of this sign is obscure. The teeth are hypoplastic and are commonly shed prematurely. Very often there is hypercalcæmia and sometimes consequent renal damage. It is possible that these infants are hypersensitive to vitamin D and that even relatively low doses may raise the serum-calcium level.

The prognosis seems poor when the disorder is clearly manifest at birth or soon afterwards; but otherwise it is more hopeful, and the bones slowly calcify, symptoms abate, and growth advances, though varying degrees of bony deformity persist. A surprising complication in some patients is premature craniostenosis, which may necessitate cranio-

1. Rathbun, J. C. *Amer. J. Dis. Child.* 1948, **75**, 822.
2. McCance, R. A., Fairweather, D. V. I., Barrett, E. M., Morrison, A. B. *Quart. J. Med.* 1956, **25**, 523.
3. Engfeldt, B., Zetterström, R. *J. Pediat.* 1954, **45**, 125.
4. Sobel, E. H., Clark, L. C. jun., Fox, R. P., Robinow, M. *Pediatrics*, 1953, **11**, 309.
5. Schlesinger, B., Luder, J., Bodian, M. *Arch. Dis. Childh.* 1955, **30**, 285.
6. Schneider, R. W., Corcoran, A. C. *J. Lab. clin. Med.* 1950, **36**, 985.

tomy.[5] Despite the apparent spontaneous healing, the low serum-alkaline-phosphatase level persists, and this may enable the disease to be diagnosed later in life, when the survivors may be first seen because of skeletal abnormalities and spontaneous fractures.[7]

Alkaline-phosphatase activity can normally be demonstrated in serum, and also in many different tissues, especially in calcifying bone, small-intestine mucosa, renal cortex, and lactating breast tissue. It seems certain that it plays an important part in normal bone formation, but its function in other situations remains obscure. Probably several different specific enzymes with alkaline-phosphatase activity exist, but they cannot as yet be identified with confidence. In mature bone, phosphatase activity is found mainly in the periosteal and endosteal regions. In developing embryos it is found in those condensations of mesenchyme destined to form membranous bones, but not those which will form cartilage; and it does not appear in cartilage until just before ossification begins. The enzyme activity may be demonstrated in the cartilage cells as they begin to hypertrophy, and it then spreads to the matrix. Evidently calcification takes place only in the presence of extracellular phosphatase. It has been generally believed that, in bone formation, the enzyme was mainly concerned with the production in the matrix of high concentrations of inorganic phosphate and the consequent precipitation of insoluble calcium phosphate. More recent work, however, suggests that phosphatase has more to do with the actual formation of the organic matrix.[8]

In hypophosphatasia, examination of material from liver, kidney, small intestine, and bone obtained at necropsy,[1 2] and from bone and liver by biopsy,[4] have shown that alkaline-phosphatase activity is deficient in all these tissues. It seems that the low serum-alkaline-phosphatase in these patients reflects a generalised defect in the formation of at least one of this group of enzymes throughout the body. The abnormal bone development which is characteristic of the disease may be reasonably regarded as a consequence of this failure in enzyme formation; and detailed studies of bone formation in hypophosphatasia may well throw new light on the normal rôle of phosphatase in this process. Similarly, we may hope that inquiry into the biochemistry of other tissues in hypophosphatasia will help to explain what phosphatase does in their normal metabolism. One interesting biochemical finding is likely to be significant: the urine of patients with hypophosphatasia contains unusually large amounts of phosphoethanolamine,[7 9 10] a phosphate ester widely distributed in the cells of many different tissues.[11] Its metabolic rôle is unknown, but the increased amounts in the urine of patients deficient in tissue alkaline-phosphatase suggest that it may be one of the natural substrates for this enzyme[7] and that it accumulates and is excreted in excess when the enzyme is deficient.

7. Dent, C. E. *In* Bone Structure and Metabolism. Edited by G. E. W. Wolstenholme and C. O'Connor. London, 1956; p. 266.
8. Bourne, G. H. The Biochemistry and Physiology of Bone. New York, 1956.
9. Fraser, D., Yendt, E. R., Christie, F. H. E. *Lancet*, 1955, i, 286.
10. McCance, R. A., Morrison, A. B., Dent, C. E. *Ibid*, p. 131.
11. Tallan, H. H., Moore, S., Stein, W. H. *J. biol. Chem.* 1954, **211**, 927.

Hypophosphatasia in more than one member of a family of brothers and sisters is not rare. Since no environmental cause has been found to account for this familial incidence, or to explain why only some children in the same family are affected, it seems probable that the condition is genetically determined. This view is supported by the common finding that some of the apparently healthy parents and other relatives of affected children have unusually low levels of serum-alkaline-phosphatase.[2 4] In at least one instance the parents of the patient were consanguineous.[12] The known data are consistent with the hypothesis that the patients with clinically apparent hypophosphatasia are homozygous for a rare abnormal gene, which in heterozygotes results in only minor biochemical abnormalities, leaving the individual clinically unaffected. But much more detailed family studies are needed to confirm this hypothesis, and other possible explanations of the familial distribution must be examined. Should the genetic hypothesis be confirmed and should the essential metabolic lesion turn out to be defective synthesis of a specific enzyme with alkaline-phosphatase activity, then the condition will fall into the classical pattern of an "inborn error of metabolism."

Annotations

MAN AND RADIATION

In more ways than one, mankind is at an important and possibly decisive point in its history: on the one hand, there is the probability, and for Britain the necessity, of a new social and industrial revolution based on nuclear power; on the other, there is the louring threat of a war fought with nuclear weapons and of a hitherto unprecedented and unimagined biological disaster. The wider the understanding of what the exploitation of atomic energy can mean (and the dangers it can bring) the more likely is it to be used wisely; and the medical profession has a vital part to play in the appreciation of what is happening and in the dissemination of the knowledge necessary for that appreciation.

We welcome therefore the statement from the United Nations Scientific Committee on the Effects of Atomic Radiation which we publish on p. 467 and which makes several very important points. In some countries at least, radiological methods now provide the most important source of artificial radiation to which man is exposed. In the words of the committee, "irradiation of human beings, and especially of their germinal tissue, has certain undesirable effects"; and artificial irradiation, administered in the course of medical practice, is already, in a few countries at any rate, quantitatively equal to the natural radiation background—a fact which makes plain the gravity of the present situation.

The weighing of the balance between the risk and the benefit of medical radiology must remain a responsibility of the medical profession. But we know very little about radiation doses and their effects, and it is therefore an important duty of every doctor, so far as lies in his power, to coöperate fully with the organisations and the individuals who are at work on these matters, so that all possible information may be sent to the United Nations committee through appropriate Government channels. It is already clear that we must urgently seek ways of reducing the radiation dose administered by diagnostic methods without diminishing their efficiency. And fuller understanding of the biological action of radiation is necessary for the more accurate assessment of tolerable

12. Ulstrom, R. *Amer. J. Dis. Child.* 1955, **90**, 554.

exposure levels. There are several difficulties in the study of the effects of low doses of radiation on man: the two main ones are those of measuring in retrospect individual and population dose, and recognising radiobiological effects and correlating them with their true causes. The prevailing uncertainty means constant reassessment and reduction of the recommended "safe" levels of radiation.

In this country machinery now exists, in the form of the committee lately appointed by the Minister of Health under the chairmanship of Lord Adrian,[1] for the collection of relevant information and for reviewing radiological practice. This committee and other bodies, such as the International Commission on Radiological Protection and the Medical Research Council, will be asking for detailed information on radiation dosages and their effects; and we hope they will receive immediate and energetic support from everyone who can help in these crucial inquiries.

LYMPHOGRANULOMA VENEREUM

THE virus infection, lymphogranuloma venereum, which can be a distressing and crippling disease, is fortunately rare in this country and when it appears it is usually in seaport areas. The infection is thought to be imported by coloured immigrants. In recent years there has been an undoubted increase in the number of cases which have been discovered: the chief medical officer of the Ministry of Health reported 63 patients with lymphogranuloma venereum in this country in 1954, and in 1955 the number had increased to 86. The rise in the prevalence of the disease may well have continued in 1956 though no official figures are yet available. It must be remembered too that, from the nature of the disease, particularly in its early stages, many cases remain undiagnosed and are therefore not recorded in the official figures; and it may be that the infection is much commoner than is generally recognised. The recent rise in the figures for lymphogranuloma venereum may be due to the increased entry of Negroes into this country, but there is no proof of this. At all events, it is clear that improvements in present methods of prevention and diagnosis would be welcome.

King et al.[2] examined 1317 patients attending the venereal-diseases clinic at the London Hospital with a view to demonstrating the incidence of lymphogranuloma venereum among this type of patient. After a full clinical history had been taken, the patient was examined and an intradermal test was performed using a yolk-sac culture of the J.H. strain of lymphogranuloma-venereum virus. The sera of all positive skin reactors were then tested for the virus by complement-fixation: fixation of complement at a serum dilution of 1 in 32 or more was regarded as confirmation of the diagnosis. The examinations of 1119 patients were completed. Of the 206 patients (18%) who reacted to the intradermal test, 23 (2%) had strongly positive complement-fixation tests. The sera of 157 (14%) patients reacted in the complement test but not at a level high enough to be taken as diagnostic. Thus, though King et al. believe that 2% of the patients were undoubtedly suffering from lymphogranuloma venereum, 14% presumably required further or longer investigation. Negroes yielded a higher proportion of skin reactors and proven disease than did whites; but there was no evidence to support the suggestion that the recent increase in lymphogranuloma venereum in this country was due to a greater influx of Negroes. Further work on similar lines in different seaport areas seems indicated.

To combat lymphogranuloma venereum, doctors, particularly those practising in and around ports, must be more alert to the possibility of this infection. The opportunity of identifying the transient painless primary lesion is rare, but ulceration of the genital area accompanied by enlarged tender inguinal glands or a bubo should arouse suspicion. The inguinal mass, consisting of many discrete enlarged lymph-nodes held together by a plastic periadenitis, is characteristic and is followed by irregular breakdown of lymph-node tissue, with fistula formation. Suspect cases should be referred to a venereal-disease clinic where skin and serological tests can be applied. Further investigation into methods of increasing the specificity and sensitivity of the complement-fixation test for lymphogranuloma venereum might help to determine more precisely the value of the test, and give a clearer picture of the present position.

1. See *Lancet*, Feb. 16, 1957, p. 381.
2. King, A. J., Barwell, C. F., Catterall, R. D. *Brit. J. vener. Dis.* 1956, **32**, 209.

STABLE SMALLPOX VACCINES

THE dried smallpox vaccines which have now been fully tested under the auspices of the World Health Organisation [1] should do much to improve control of a disease which is still a major menace. In the hot countries chiefly afflicted by smallpox, efficient vaccination has been difficult because ordinary vaccine lymph quickly deteriorates unless kept cool, and the vaccinators seldom have rapid transport or efficient refrigeration at their disposal. Often the population will not come to the large centres where stocks of lymph can be held in refrigerators; and when vaccinators go to the villages, which may be many days' journey from urban centres, their lymph is liable to lose its virtue on the way. For the same reason it may be difficult to hold adequate reserves of lymph at local centres, and the immediate control of epidemics has thus been hampered. But every country can now have dried smallpox vaccine which will withstand many weeks' exposure to tropical temperatures and which will last indefinitely in an ordinary refrigerator working at the usual domestic temperature.

The W.H.O. trials, which started in 1952, were carried out in two stages. The first was a purely laboratory study of the keeping qualities of dried and wet (glycerinated) vaccines produced by laboratories in four different countries. They were tested for heat resistance and bacterial purity in laboratories in Elstree (England), Copenhagen, and Paris after storage at 0°, 22°, 37°, and 45°C for periods varying up to 2 years. The results of these studies have not been published, but by courtesy of W.H.O. it may be said that, though the dried vaccines from all four laboratories were definitely more resistant to heat than the corresponding wet vaccines, there was much variation and one dried vaccine was outstandingly better than the others.

A second batch of this vaccine and another vaccine which had given promising results in a similar study were therefore included in the second stage of the trials. This was a combined field and laboratory study of the two dried vaccines after periods of storage at 37° and 45°C. The dried vaccines selected for this trial were another batch from the laboratory whose vaccine had come out best in the first trial and a vaccine from another laboratory which had given encouraging results in another trial. The dried vaccines were held at 37° and 45°C for periods of 4, 8, 16, 32, and 64 weeks, after which they were tested for potency in the laboratory and for vaccination-success rates on volunteers in the Royal Air Force. The laboratory tests were done in duplicate in the department of bacteriology of the University of Liverpool and at the Lister Institute, Elstree, and the potency of all the vaccines was assessed by counting pocks on the membranes of the chick embryo, in addition to the usual test on the skin of the rabbit. The test vaccinations were on groups of 100 recruits with no history of previous vaccination and no scars. For the first time, it was possible to investigate the

1. Cockburn, W. C., Cross, R. M., Downie, A. W., Dumbell, K. R., Kaplan, C., McClean, D., Payne, A. M-M. *Bull. World Hlth Org.* 1957, **16**, 63.

relative accuracy of the two laboratory methods of test and to assess their relation to success-rates in the field.

In this trial one dried vaccine resisted heat better than the other. The less successful vaccine, however, still produced a 47% vaccination-success rate after 4 weeks at 45°C (a very severe test), 96% successes after 8 weeks at 37°C, and 72% after 16 weeks at 37°C. Though the more successful vaccine showed a slight but significant drop in potency after storage at 45°C for 64 weeks, it still produced 100% vaccination successes in the field, as it had at all the earlier tests. This indicates that after long exposure in hot climates it would still produce the maximum possible number of successful vaccinations. The potency tests revealed the superiority of titration by pock-counting on the membranes of the developing chick: the results obtained by this method showed a satisfactory correlation with the vaccination-success rates in the field.

On p. 446 we publish an article on the heat resistance of a dried smallpox vaccine, prepared at the Lister Institute of Preventive Medicine, which resisted heat very well, as judged both by laboratory titration and by clinical trial. We may add that dried vaccine produced by this method has been in use by the Armed Forces for the last two years with uniform success, and is also being prepared for the reserves maintained in this country against an epidemic. The fact that stable smallpox vaccine is now to be had should enable public-health authorities in hot climates to review their arrangements for the control of smallpox by prophylactic vaccination and to hold reserves of vaccine in many localities for use as soon as smallpox breaks out.

DIABETES MELLITUS AND ANÆSTHESIA

IN the preparation of diabetic patients for general anæsthesia, glucose is often given by mouth. It is of the greatest importance to prevent both hypoglycæmia and ketosis in these patients, but it is equally imperative not to overlook the potential dangers of regurgitation and vomiting when glucose is given shortly before anæsthesia is induced. During the past few years, these events have achieved some notoriety as causes of death and other complications in *all* patients given a general anæsthetic, including some with diabetes mellitus.

The normal emptying time of the stomach after a solid meal is about four hours, and up to two hours after fluid. Thus preoperative oral carbohydrate, if it is to serve any useful purpose, must be given so close to the time of anæsthesia that it becomes a potential hazard, unless the stomach empties quickly. In fact, it may well empty slowly because of fear, premedication, and the glucose itself.

King [1] has lately confirmed that the hazard is a real one. 200 ml. of water, containing phenol red and 50 g. glucose, was given to each of a group of fasting healthy young adults, and the stomach was completely aspirated at intervals varying from fifteen minutes to two hours. It was found that, on the average, the meal was diluted to about twice its volume, but that after two hours only 46 ml. of fluid, containing 0·3 g. glucose, remained. A similar solution, but containing no phenol red, was given to each of 20 diabetic and non-diabetic patients two hours before operation; the stomach was aspirated two hours later. Previous investigations had shown that gastric function was normal in all these patients, yet in 10 of them volumes ranging from 100 to 265 ml. (average 146 ml.), containing 2–10·2 g. glucose were removed from the stomach. Thus, there seems little doubt that preoperative glucose solutions given by mouth are potentially dangerous and unlikely to prevent hypoglycæmia.

The answer is to give the glucose intravenously or not at all. A single intravenous injection of glucose given not more than an hour before the induction of anæsthesia may be enough for a minor operation on some diabetic patients; but in most cases King recommends continuous intravenous glucose over a number of hours, including the postoperative period, when there may be nausea and vomiting. Soluble insulin should be given in divided doses every four or six hours. King believes that this method is the safest and most effective means of ensuring good control for all diabetic patients undergoing emergency or major operations, and for patients with severe diabetes whatever the operation. Many mild diabetics need no glucose preparation for a small operation, provided it is carried out early in the morning and an adequate intake of carbohydrate is ensured after operation.

King has clarified a subject which is often an irritation to anæsthetists, but he adds a wise reminder that dogma has no place in the control of diabetic patients treated by surgery: each case must be considered individually.

1. King, R. C. *Anæsthesia*, 1957, **12**, 30.

OPERATING ON EMPHYSEMATOUS BULLÆ

AN emphysematous bulla may become very big and give rise to respiratory distress by compressing adjacent lung. If the cause of the trouble is a localised defect of the bronchial tree acting as a check-valve,[1] treatment is straightforward—removal of the affected lobe or segment will liberate the compressed healthy lung and allow it to function. But most emphysematous bullæ are associated with generalised respiratory disease, and then the outcome of operation is more problematical. These bullæ are usually found in patients with chronic bronchitis, and are merely gross examples of widespread emphysematous lesions caused by air-trapping. But routine radiography occasionally discloses large air-spaces traversed by filmy strands of tissue in the lungs of people who give no history of respiratory trouble and in whom no evidence of bronchospasm can be detected: such lesions may be due to degeneration of the pulmonary elastic tissue, and they produce respiratory insufficiency only if the degenerative process extends, if spontaneous pneumothorax occurs, or if air-trapping (due to bronchial distortion) causes enlargement of the space with compression of adjacent lung.

Surgeons have tried to treat these bullæ in various ways. Thoracoplasty has been used in an attempt to obliterate them by external compression, but the results have been poor. More success has been claimed for Monaldi drainage [2] (continuous intra-cavitatory suction applied by means of a catheter inserted through the chest wall); but this is a laborious procedure involving preliminary pleurodesis to prevent leakage of air or infection from the bulla into the pleural space, and it has won few adherents. Resection of the lobe or segment is probably the most widely used operation, and, though it seems undesirable that the remaining part of the lung should have to overexpand to fill the hemithorax, Deterling [3] considers that the consequent straightening of the bronchi may bring about a useful improvement in air-flow. He advises against such space-filling measures as plombage, which may have the opposite effect. Massie and Welchons [4] point out, however, that resection of a bullous pulmonary unit may entail the sacrifice of functioning lung tissue which can ill be spared; they recommend local excision, even of multiple bullæ, where this will conserve useful lung.

Stringer and Burnett [5] now go further and condemn excision altogether. They advocate the more economical technique of obliterating the bulla by removing its pleural roof and approximating the pleura and the parenchyma which forms its walls with a continuous suture of fine chromic catgut, each bite including the least possible

1. Allison, P. R. *Thorax*, 1947, **2**, 169.
2. Head, J. R., Avery, E. E. *J. thorac. Surg.* 1949, **18**, 761.
3. Deterling, R. A. jun. *In* Pulmonary Emphysema. London, 1956; p. 433.
4. Massie, J. R. jun., Welchons, G. A. *Ann. Surg.* 1954, **139**, 624.
5. Stringer, C. J., Burnett, C. A. *Amer. Rev. Tuberc.* 1956, **74**, 856.

depth of parenchyma. This type of operation gave good results in 18 patients, all of whom had obvious respiratory insufficiency due to compression of lung tissue by the emphysematous bullæ themselves or by spontaneous pneumothorax resulting from the rupture of such bullæ. Postoperative complications were few: in 2 cases intercostal suction for a fortnight was needed to re-expand the lung, and in a 3rd patient (who had presented as a spontaneous pneumothorax) thoracoplasty had to be performed because the lung did not re-expand fully. There were no deaths, and all the patients, some of whom had been respiratory cripples, were able to return to work. Pulmonary reserve has remained good for periods ranging from six months to four years since operation.

The scope of surgery in the treatment of generalised pulmonary emphysema is severely limited even when the pressure effects of large bullæ contribute significantly to the impairment of respiratory function; but these results indicate that surgery has sometimes much to offer.

ESSENTIAL HYPERTENSION IN CHILDHOOD

THE measurement of blood-pressure in infants and children is fraught with potential errors. Restlessness or crying may raise the systolic blood-pressure by 20–30 mm. Hg in infants,[1] and a sphygmomanometer cuff that is not wide enough may give readings that are too high. It is also important to recognise the physiological increase in systolic and diastolic pressures which takes place throughout the growth period, so that normal standards may be available [2] against which abnormally high readings may be measured. A persistent reading of more than two standard deviations above the normal for age is generally regarded as representing hypertension.

Hypertension is less common in childhood than it is in adult life, and when it is found it is usually associated with renal disease, coarctation of the aorta, endocrine disturbances, or diseases of the central nervous system. Essential hypertension seems to be rare in childhood,[2 3] but it is a condition which must be considered when the more usual causes of a raised blood-pressure have been ruled out. (Clearly, such operable conditions as unilateral renal disease, coarctation of the aorta, and phæochromocytoma must be carefully excluded before a diagnosis of essential hypertension is made.) Haggerty et al.[2] have recently described 9 children under the age of 14 years in whom they made this diagnosis, the youngest being discovered at the age of 7 months. They took as their criterion of hypertension at all ages a blood-pressure which was persistently above 130/90 mm. Hg. In 5 children the blood-pressure was more than 160/110 mm. Hg and in all of them headaches and changes in the retinal blood-vessels were present; 2 also had convulsions and hemiplegia, and 1 of them died. Essential hypertension was diagnosed when exhaustive clinical and laboratory investigation failed to reveal any well-defined cause for the raised blood-pressure; and the search included surgical exploration of the abdomen in all 5 children with serious hypertension. In 5 cases, 4 of them mild, there was a family history of hypertension.

Treatment follows much the same pattern as in adults. Sedation and weight reduction when necessary are important; but restriction of activity and a low-sodium diet have not proved practicable in children and they were not therefore adopted by Haggerty. Of the hypotensive drugs, they found rauwolfia, hydrallazine hydrochloride ('Apresoline'), and hexamethonium were all of some value in the milder cases. For the treatment of hypertensive encephalopathy, they were impressed by the efficacy of the ganglion-blocking agent trimetaphan camphorsulphonate ('Arfonad'). In 4 of the most severely affected children, sympathectomy was carried out, with benefit to 2 of them.

Though permanent elevation of the blood-pressure is rare in children, a transient rise is quite common. The significance of this finding is not fully understood, but there is some evidence to suggest that children whose blood-pressure behaves in this way may develop essential hypertension in adult life.[3] Hines [4] studied 1522 adults, who were divided into two groups and re-examined ten and twenty years after they had first had their blood-pressures measured. Of those in whom the initial reading was 140/85 mm. Hg or less only just under 4% had persistent hypertension twenty years later; on the other hand, in a similar group in whom the first reading was over 140/85 mm. Hg as many as 82% had persistent hypertension twenty years later. Levy et al.[5] found similar but less striking differences among some army officers in a five-year follow-up. Thus, children who show transient rises in blood-pressure may grow into adults with essential hypertension; but further investigation is needed before such a conclusion can be drawn.

DISLOCATIONS OF THE LUNATE

INJURIES of the carpal bones are not uncommon, but they often escape detection. The increasing awareness of the difficulties in the diagnosis of the scaphoid fracture has not, on the whole, been accompanied by better recognition of the more extensive injuries of the scaphoid and lunate. Provided the possibility of a carpal dislocation is borne in mind, its diagnosis from standard wrist films should present no difficulty.

It is customary to separate injuries about the lunate into two groups—dislocation of the bone and dislocation of the carpus about it. Dislocation of the carpus is commonly associated with a scaphoid fracture, and injuries of the radial and ulnar styloids may also be present. A simple dislocation of the lunate in the early stages can almost always be reduced by local pressure over the lunate, assisted by traction on the fingers, at first in extension of the wrist, and then in flexion. The results of this manœuvre are good, and aseptic necrosis rarely follows. Operative reduction, on the other hand, is seldom satisfactory, and it is probably better to excise the lunate, though the wrist may not recover full function. A recent perilunar dislocation of the carpus, if the scaphoid is not fractured, can also be reduced manually, and if this fails, open reduction gives a fair result. When the injury is associated with a scaphoid fracture, however, the problem is much more difficult. If adequate reduction of the fracture-dislocation can be achieved, then the scaphoid may well unite, although immobilisation for five or six months is often necessary, and the incidence of avascular necrosis of the proximal fragment of the scaphoid may be as high as 50%.[6] Excision of the avascular proximal fragment of the scaphoid allows partial dislocation of the capitate and produces a very poor wrist. It is for these patients, and for those in whom accurate reduction is not possible, that Wagner [7] favours immediate wrist fusion. Such an approach may well shorten the total period of disability.

1. Woodbury, R. A., Robinow, H., Hamilton, W. F. *Amer. J. Physiol.* 1938, **122**, 472.
2. Haggerty, R. J., Maroney, M. W., Nadas, A. S. *Amer. J. Dis. Child.* 1956, **92**, 535.
3. Sobel, I. P. *Ibid*, 1941, **61**, 280.
4. Hines, E. A. *J. Amer. med. Ass.* 1940, **115**, 271.
5. Levy, R. L., Hillman, C. C., Stroud, W. D., White, P. D. *Ibid*, 1944, **126**, 829.
6. Russell, T. B. *J. Bone Jt Surg.* 1949, **31B**, 524.
7. Wagner, C. J. *Ibid*, 1956, **38A**, 1198.

THE INDEX and title-page to Vol. II, 1956, which was completed with THE LANCET of Dec. 29, is published with our present issue. A copy will be sent gratis to subscribers on receipt of a postcard addressed to the Manager of THE LANCET, 7, Adam Street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive indexes regularly as published should do so now.

Special Articles

THE RESPONSIBILITIES OF THE MEDICAL PROFESSION IN THE USE OF X RAYS AND OTHER IONISING RADIATION

Statement by the United Nations Scientific Committee on the Effects of Atomic Radiation

I. INTRODUCTION

(1) The United Nations General Assembly, being aware of the problems in public health that are created by the developments of atomic energy, established a Scientific Committee on the Effects of Atomic Radiation. This committee has considered that one of its most urgent tasks was to collect as much information as possible on the amount of radiation to which man is exposed today, and on the effects of this radiation. Since it has become evident that radiation due to diagnostic radiology and to radiotherapy constitutes a substantial proportion of the total radiation received by the human race, the committee considers it desirable to draw attention to information that has been obtained on this subject.

(2) Modern medicine has contributed to the control of many diseases and has substantially prolonged the span of human life. These results have depended in part on the use of radiation in the detection, diagnosis, and treatment of disease. There are, however, few examples of scientific progress that are not attended by some disadvantages, however slight. It is desirable therefore to review objectively the possible present or future consequences of increased irradiation of populations which result from these medical applications of radiation.

II. GENERAL SURVEY OF THE IRRADIATION OF HUMAN BEINGS

(3) Man has always been exposed to some irradiation from natural sources. To this has now been added, as a result of modern discoveries and the applications of ionising radiation and radioactivity, certain forms of artificial irradiation.

(4) *Natural irradiation* is due to :

(1) Cosmic radiation,

(2) " Background " gamma radiation from radioactive substances present locally in the earth, rock, or building materials, and from disintegration products of radon in air,

(3) Radiations emitted from natural radio-elements such as potassium 40, radium, radon, and carbon 14 which are incorporated in the body.

(5) The amount of this natural radiation varies with locality, but has been estimated as usually delivering between 70 and 170 mrems per year to the gonads. Of this total, the major contributions are of about 45% from local gamma radiations, 30% from cosmic rays, and 20% from body potassium 40.[1]

(6) *Artificial irradiation* is derived from

(1) The contamination of the environment, the atmosphere, or water by radioactive waste from atomic industries or from users of radio-elements ;

(2) The radioactive fall-out, at greater or lesser distances from the source, or radioactivity resulting from the explosion of nuclear devices ;

(3) The occupational exposure of certain groups of workers : medical practitioners, radiologists, dentists, nurses, atomic-energy workers, uranium or thorium miners, and the industrial or scientific users of radiation generators or radioactive isotopes ;

(4) The medical use of X rays, other ionising radiations, and radio-elements in the detection, diagnosis, investigation, and treatment of human diseases ;

(5) The use of certain devices which emit radiation, such as television receivers, watches with luminous dials, and the X-ray generators used for the purpose of fitting shoes.

(7) The amount of artificial radiation must vary considerably in different countries and we have inadequate information as to the over-all significance of these factors. In certain countries where estimates have been made, it appears that the greatest gonad irradiation of the population is due to diagnostic radiological procedures, the amount from this source about equalling that from all natural sources in certain instances. The total present contribution from occupational exposure, from the products of atomic industries, from radiotherapy, and from the radiating devices mentioned above (paragraph 6, sub-paragraph 5) is likely to be very considerably smaller. That from radioactive fall-out to the gonads appears at present to be in the region of 1% of the natural gonad irradiation in most areas.[2]

(8) Both the magnitude and the significance of these various sources are under review by the committee. Since medical irradiation accounts for a substantial if not the major proportion of all artificial exposure, it is important that its magnitude should be known accurately for different countries and circumstances. The possibility of making such an assessment depends upon the help of the medical profession, and particularly on the adequacy and availability of records kept by doctors, dentists, and organisations responsible for the use of ionising radiation.

III. RADIATION HAZARDS

(9) The medical use of radiation is clearly of the utmost value in the prevention, diagnosis, investigation, and treatment of human disease, but the possible effects of this irradiation of individuals require examination.

(10) Generally speaking, the irradiation of living beings may produce radiobiological effects either on the irradiated individual himself or, through him, on his descendants ; the former being termed somatic and the latter genetic effects. Somatic effects vary according to the different organs or tissues affected, and range from slight and reversible disturbances such as cutaneous erythema to the induction of leukæmia or of other malignant diseases. The possible reversibility of the somatic effects of radiation received in small doses or at low dose rates encourages the belief that there are permissible doses of radiation which will not cause completely irreversible or significant somatic damage. The threshold for occasional somatic damage may, however, prove to be low. In the case of genetic effects, on the other hand, there may be no threshold. These effects increase with a frequency corresponding to the total amount of radiation received by the germinal tissues, and in the great majority of cases, are adverse.

(11) Many other factors complicate the interpretation of radiobiological effects. The differences between whole and partial body radiation, between a single exposure and continuous irradiation, or between the effects of different types of radiation are still imperfectly understood. Biological differences in the radiosensitivity of various tissues, or of the tissues of people of different age or sex, obviously influence the nature of radiation hazards. It is clear, however, that any radiation of gonads, and any substantial irradiation of other tissues, involve a chance of significant damage which requires assessment.

IV. GENERAL RECOMMENDATIONS REGARDING THE MEDICAL AND OCCUPATIONAL IRRADIATION OF HUMAN BEINGS

(12) The radiological profession, through the International Commission on Radiological Protection,[3] has

1. From reports sent by India, Sweden, the United Kingdom, and the United States of America.

2. According to the reports sent by the United Kingdom and the United States of America.

3. Report of the International Commission on Radiological Protection. *Brit. J. Radiol.* December, 1954, suppl. no. 6 ; *J. franç. electro-radiol.* October, 1955, no. 10, &c.

undertaken a valuable and responsible duty in defining maximum permissible limits of exposure for the main radiation hazards.

(13) The establishment of these maximum permissible levels for those who are occupationally exposed to radiation depends on the view that there are doses which, in the light of our present knowledge, do not cause detectable somatic injury in the individual irradiated; and on the consideration that the number of individuals concerned is small enough for the genetic effects on the whole population to be negligible. For the gonads, or for irradiation of the whole body, the levels are such as to exclude doses greater than 0·3 rem in any week or 3·0 rem in any 13 weeks, or a sustained irradiation rate greater than 5 rem per year. These values imply that no total dose of over 50 rem will have been received by the gonads by the age of 30, or of over 200 rem by the whole body by the age of 60, in any occupationally exposed person.[3]

As regards irradiation of the whole population, it is considered prudent to limit the average dose to germinal tissues from artificial sources to the order of magnitude of that received from all natural sources.

(14) In considering the extent to which the population is irradiated for medical purposes, it is essentially the genetic hazard which is involved although it seems possible that in certain circumstances somatic injury may occur occasionally after low doses of radiation arise. Otherwise, the relevant dose is that indicating the mean gonad irradiation among the population as a whole up to the end of the average reproductive period.

(15) The extent of such genetic irradiation from diagnostic procedures has been found to be equal to at least 100% of all natural radiation in two countries,[4] and that from a third equalled at least 22% of this figure.[5] Even before obtaining more exact values for these and other countries, it is clear that the exposure can be substantial in countries with extensive medical facilities, and that it is essential to consider any ways in which this exposure could be reduced without detriment to the existing or developing value of medical radiology.

(16) The committee is therefore anxious to obtain the help of radiologists in suggesting through appropriate governmental channels any methods by which this total exposure could be reduced and in estimating the amount of reduction that might be expected from any such methods. In particular it would be valuable to know how much the radiation to the gonads could be reduced.

(*a*) by improved design or shielding of equipment,
(*b*) by fuller training of any individuals using radiographic or fluoroscopic equipment,
(*c*) by any local shielding of the gonads that is practicable, especially during abdominal or pelvic examination,
(*d*) by the use of techniques involving radiography rather than fluoroscopy when full information can be obtained by this means,
(*e*) by improvement of administrative arrangements designed to obviate unnecessary repetition of identical examinations of the same subject,
(*f*) by a general study of certain medical conditions such as that of peptic ulcers, to identify the circumstances in which the establishment of a radiological diagnosis has or has not a definite influence upon the treatment or prognosis given.

V. SUMMARY

(1) The Scientific Committee on the Effects of Atomic Radiation established by the United Nations General Assembly accepts the view that the irradiation of human beings, and especially of their germinal tissue, has certain undesirable effects.

(2) Information received so far indicates that, in certain countries (Sweden, United Kingdom, United States of America), by far the most important artificial source of such irradiation is the use of radiological methods of diagnosis and that this may be equal in importance to radiation from all natural sources. It is possible that such radiation may be having a significant genetic effect on the population as a whole.

(3) The committee is fully aware of the importance and value of the medical use of radiations but wishes to draw the attention of the medical profession to these facts and to the need for a more accurate estimate of the amount of exposure from this source. The help of the medical profession would be most valuable to make it possible to obtain fuller information on this subject.

(4) The committee would be particularly grateful for information through appropriate governmental channels on ways in which the medical irradiation of the population can be reduced without diminishing the true value of radiology in diagnosis or treatment.

4. Sweden, United States of America.
5. United Kingdom.

MALTA MEDICINE

EARLY last year a dispute arose between the government of Malta and the Medical Officers' Union. As part of the settlement of this dispute a commission was appointed to review the medical services of Malta and Gozo and make recommendations for their future organisation. Mr. John Cronin, M.P., had previously submitted a short report on the services.[1] The chairman of the commission was Mr. Leslie Farrer-Brown, director of the Nuffield Foundation, who was nominated by the Colonial Secretary. The other members were Sir Harold Boldero and Mr. J. Bagot Oldham, nominated respectively by the Royal Colleges of Physicians and Surgeons. They have now made their report,[2] in which they endorse the view that "Malta is midway in the modernisation of its medical and health service."

The report commends the progress already made, but says that much remains to be done. Development has so far been piecemeal with no general plan. There is still much suspicion and ill-will between the government and the doctors, and the commission hopes that the government will set about healing the breach by giving a clear indication of its good intentions. The following is a summary of the findings and advice given in the report.

ADMINISTRATION

At present the health services are controlled by the minister of health, the chief government medical officer, the senior medical officer (who is in charge of hospital and specialist services, district medical services, and the School for Nurses), and the senior health officer (who is in charge of public-health services). There are certain statutory bodies such as the Council of Health (which recommends legislation and investigations), the Medical Board (which has various duties including the issue of licences to practise), and the Board of the Hospital for Mental Diseases (which is concerned with certifying insane persons but not with administering the hospital), as well as the non-statutory Hospital Board, which was formed in 1955 to advise on the running of the hospitals, has met few times, and is regarded as a failure.

Comment.—Control is over-centralised and the senior officers have not enough staff. There is no established machinery for consultation between government and doctors. The disciplinary machinery is faulty. The implied distinction between medicine and health is unfortunate.

Proposals.—Three bodies should be created:

(1) A Medical Council, with functions similar to those of the General Medical Council in Britain. The chairman would be a judge and the members include some appointed

1. See *Lancet*, 1956, ii, 1271.
2. Farrer-Brown, L., Boldero, H., Oldham, J. B. Report of the Medical Services Commission. London, 1957.

by the government and the university and some elected by doctors and dentists.

(2) An Advisory and Executive Board, whose members would be in part appointed by the government and the hospital management committees and in part elected by doctors and nurses. It would advise the Minister on various topics, keep a register of professions, and review the terms of service of medical appointments. It should have several standing committees.

(3) Four hospital management committees, to ease the administrative load on the headquarters staff and improve the running of the hospitals. On each about a third should be active staff in the hospitals and a third laymen, with a lay chairman. The mental hospitals in Malta and Gozo would come under one committee and all other hospitals in Gozo under another, which could with advantage be made the standing committee for Gozo on the Advisory and Executive Board.

HOSPITALS

The existing hospitals are reviewed in detail.

St. Luke's is the main general hospital with over 500 beds, and there is room for expansion in the present buildings. It has consultants in various specialties, and the physician, surgeon, and accoucheur are professors in the university. There are three anæsthetists; often one is working in two operating-theatres simultaneously. There is a large but ill-equipped and ill-staffed laboratory. The female nurses are controlled by a mother-superior and the male nurses by a wardmaster, neither of whom is State-registered. Most ward-sisters are State-registered and most nursing is done by hospital attendants.

The Central Hospital has a few beds for venereal disease, dermatology, and ophthalmology; most of it is used as a police headquarters. There are an ophthalmic clinic, which is too small, and antiquated radiotherapy apparatus. The other hospitals house mental patients, the infirm and chronic sick, the diminishing number of lepers, and patients with tuberculosis, tinea capitis, and infectious diseases.

In Gozo is an adequate general hospital of 94 beds, a mental hospital, and a home for the infirm.

Comments and Proposals.—The basic specialties are well established, but there are no units for such sub-specialties as neurology or plastic surgery. Such units are not needed, in view of arrangements with hospitals abroad and the possibility of each of the present consultants developing a special interest.

More and better accommodation is required for the chronic sick, with more segregation—e.g., the young from the old. More doctors, and especially more administrative assistants, are wanted. All the hospitals were spotlessly clean, but on the whole cheerless and ill-provided with amenities. The internal and external surroundings should be made more cheerful and occupational therapy should be provided.

There is little or no shortage of beds; but more consultants, more residents, and many more nurses, technicians, and clerks are needed. Some consultants seem to have insufficient qualifications and experience, and either a scheme for much more postgraduate teaching overseas should be started at once, or the conditions should be improved enough to attract trained specialists from abroad. Selected laboratory assistants should also be sent abroad for training.

Each medical superintendent should be responsible to the hospital management committee, and in St. Luke's Hospital his load of responsibility should be shared by a medical staff committee including all the consultants. There should be a lay secretary and a fully qualified matron, and a records officer trained in Britain.

More beds (including an admission block for men) are urgently needed at the mental hospital, and new accommodation at St. Luke's is needed for the units now at the Central and isolation hospitals. But there is no need for a new general hospital, for St. Luke's would be big enough if fuller use was made of existing beds. The only waiting-lists are a short one for ear, nose, and throat cases and one for minor surgical cases. The demand for children's beds is generally falling and home-care schemes would help to reduce it even further.

NURSING

Working on the two islands are 87 State-registered nurses, and 646 hospital attendants most of whom have had no proper training. There is a school for nurses at St. Luke's Hospital, but very few apply for training. This is partly because nursing as a profession is not held high in public esteem and partly because conditions and pay for student nurses are poor, especially compared with those of hospital attendants. A proposed training-course for attendants has been delayed because of a dispute over lecture fees.

Most ward sisters are members of the order of Sisters of Charity, to whom Malta "has reason to be grateful." But few are State-registered, though the mother-provincial of the order intends to send more to Britain for training.

Recommendations.—Every hospital should have a matron who is a State-registered nurse and who must be an equal partner with the medical superintendent. She should be responsible for the nursing and welfare of patients, for the recruitment, training, and welfare of nurses, and for ward equipment, but not for catering. There should be higher pay for students and State-registered nurses and a fully residential school, and the present ward sisters should be encouraged to train for State registration.

DISTRICT SERVICES

Malta is divided into three areas, each with its medical officer of health. He has a staff of sanitary inspectors and health visitors. There is a public-health laboratory and antenatal, child-health, school, and tuberculosis services. The district nursing is done by a small voluntary organisation.

Proposals.—The responsibilities of the M.O.H. should be enlarged and he should be given clerical help and an assistant chief sanitary inspector. The health visitors need better training. The obstetric services should be more unified. The family doctor who is to conduct the delivery should give antenatal care, and the antenatal clinics be replaced by consultative clinics staffed by obstetric specialists. Similarly, hospital and district care for babies and children should be part of one comprehensive service, whose staff should consist in family doctors rather than full-time clinic officers. The care of mentally deficient children needs great expansion.

A campaign to make the public aware of the importance of dental health should be begun. As it succeeds more dentists will be needed.

The government should grant the district nursing association enough money to expand its services to cover the island. The industrial health service should be part of the general medical service.

At present, prescriptions for free drugs for the needy are scrutinised centrally with much delay. This scrutiny should be abolished or made locally.

INSURANCE CERTIFICATION AND NEEDY PATIENTS

Whole-time doctors are employed to investigate claims under the National Insurance Act. There is little justification for this unsatisfactory system, and certificates from the doctor treating the patient should be accepted.

Few patients pay hospital fees, and even fewer pay the maximum fees, but even these do not cover the cost of treatment. The needy can also get aid for drugs, appliances, special diets, &c., and there are district medical officers to care for them. This last system is unsatisfactory in many ways, not least because the patient has no choice of doctor. Poor patients should be allowed to consult a family doctor in the ordinary way, and he should be paid by the government for such services—preferably on a capitation rather than a fee-for-service basis. The present district medical officers hold pension rights which would have to be honoured.

TERMS OF EMPLOYMENT OF DOCTORS

The present arrangements are full of anomalies. The doctors in government service should be divided into:

(*a*) Professional Civil Servants, including the chief government medical officer (whose salary should be £2000 a year, i.e., the equal of the highest-ranking Civil Servant), medical officers of health, and port medical officers.

(*b*) Clinicians having no relationship to the Civil Service.

The appointments of the clinicians should be whole-time (without private practice), or part-time and paid on a sessional basis.

Those holding conjoint posts (with government and university) would be reckoned as part-time clinicians. Specialist posts should carry superannuation rights. The payment recommended for each weekly session is £175 per annum for the senior consultants and £120–170, according to seniority, for the other consultants. A medical superintendent engaged mainly in administration should be paid £1250 and given free board and lodging. The junior posts would carry proportionately smaller salaries.

There should be scholarships for study abroad free from any legal restriction about future service.

THE PRIME MINISTER TO THE NEGOTIATING COMMITTEE

ON Feb. 26 the Prime Minister published his reply to a letter sent to him by Sir Russell Brain and Dr. A. Talbot Rogers, joint chairmen of the Negotiating Committee, in which they expressed the committee's dissatisfaction at the Government's decision to appoint a Royal Commission to consider the profession's remuneration claim. In the committee's view:

"The Government has refused to honour its obligation to apply the terms of the Spens Committee's reports, as interpreted by the Danckwerts award. It has thus broken its agreement with the doctors when they entered the health service. It has been made clear that the Government does not recognise this obligation, but the late Minister of Health, Mr. Turton, said that it would not be right for him to be judge in his own cause."

The committee agreed, however, that the method of adjusting medical remuneration to changing circumstances might usefully be considered. They added:

"If that stood by itself we should welcome the opportunity of assisting the Government in every way possible. But a Royal Commission is no answer to the present claim, and it is manifestly unfair that doctors who have had no compensation for the rise in the cost-of-living for six years should await the result of the slow deliberations of a Royal Commission, and meanwhile be expected to go on loyally and ungrudgingly maintaining the health service though their real incomes remain grievously depressed. We therefore ask that the present dispute between us should be submitted to an independent arbitrator without delay."

The text of the Prime Minister's reply is as follows:

"Dear Sir Russell Brain: I have to acknowledge the letter of February 21 signed by yourself and Dr. Talbot Rogers regarding the difficult situation that has arisen in connexion with the remuneration of doctors in the health service.

"Naturally I am very sorry that it has not been possible to arrive at an agreed solution of this problem. The Government feels that the Royal Commission is the only way in which a permanent system can be devised which will stand the test of time. I want to assure you that the purpose of the Royal Commission is not to waste time. On the contrary, I shall certainly urge its chairman to proceed without delay. Moreover, the work of the Royal Commission would not preclude some interim adjustment.

"I must also repeat the Government's offer to deal with certain classes, that is hospital officers up to senior registrars, immediately.

"While I realize the disappointment of your members at any delay I am convinced that in the long run this procedure is likely to improve the relations of the medical profession with the State and the public whom they serve so loyally."

Public Health

HOUSEHOLD INFECTION IN POLIOMYELITIS

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THE investigation reported here is concerned with some of the facts known about poliomyelitis patients in households where there have been 2 or more cases. The data relate to all such cases notified in England and Wales during the years 1951–54. Similar studies have been published abroad, but no comparable figures have appeared for this country.

TABLE I—DISTRIBUTION OF MULTIPLE CASES OF POLIOMYELITIS IN HOUSEHOLDS

No. of cases in household	No. of households			
	Paralytic cases only	Non-paralytic cases only	Paralytic and non-paralytic cases	All cases
1	7603	3731	0	11,334
2	72	72	88	232
3	3	8	15*	26
4	0	2	1†	3
Total	7678	3813	104	11,595

* 6 households with 2 paralytic cases and 9 with 2 non-paralytic cases.
† 2 paralytic and 2 non-paralytic cases.

MATERIAL AND METHOD

The information used was available from an investigation (Medical Research Council 1956) on inoculation procedures and neurological lesions, and comprised records of cases of poliomyelitis notified between April 1, 1951, and Dec. 31, 1954. Cards existed for each patient giving the following information: (*a*) age and sex, (*b*) whether paralytic or non-paralytic, (*c*) date of onset of illness, (*d*) address, and (*e*) history of tonsillectomy or inoculation within twelve weeks of onset.

These records were examined to identify all cards which showed the same address. All cards that related

TABLE II—AGE AND SEX DISTRIBUTION OF PRIMARY AND SECONDARY CASES OF POLIOMYELITIS IN HOUSEHOLDS WHERE MULTIPLE CASES HAVE ARISEN. PRIMARY CASES INCLUDE ALL DOUBLE PRIMARIES WITH ONSETS ON THE SAME DAY

Age (yr.)	Primary cases			Secondary cases			All multiple cases		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
0–5	66	60	126	36	46	82	102	106	208
6–10	61	26	87	39	24	63	100	50	150
11–15	16	10	26	15	17	32	31	27	58
16–20	7	7	14	8	8	16	15	15	30
> 20	22	23	45	24	35	59	46	58	104
	172	126	298	122	130	252	294	256	550

to institutions such as schools, barracks, and places other than ordinary households—about 10% in all—were then eliminated. The remaining cards were taken to refer to individual households. This process may appear rather arbitrary, but there was in fact little difficulty in classifying the institutional cases, and the remainder were nearly all people of the same name living at the same address.

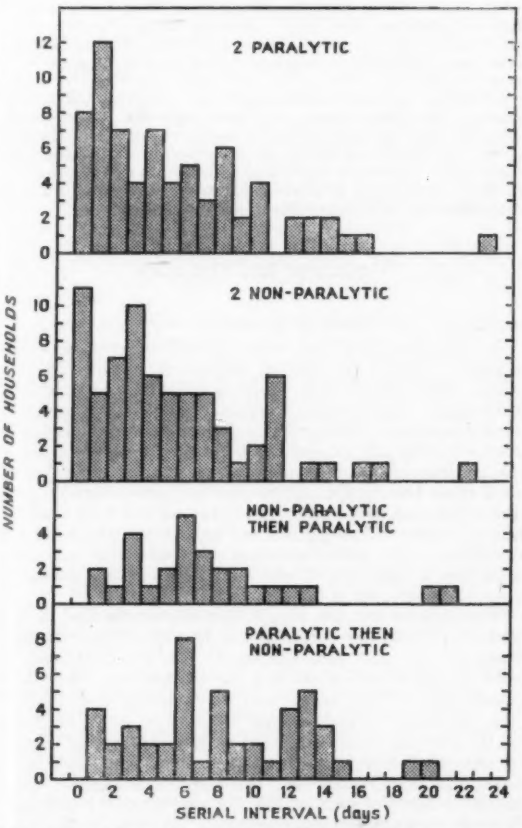
The records were complete in almost every instance, but in one or two the exact age was not given or the date of notification was given instead of the date of onset. There were 5 households in which the dates of onset of illness were more than sixty days apart; these were excluded from further study.

RESULTS

Household Distribution

Table I shows the number of households with various numbers of paralytic and non-paralytic cases. The number of households with single cases is slightly overestimated, since multiple cases in institutions were eliminated but single cases were not.

The proportion of households with multiple cases was about 2·3%—rather less than the 3·6% reported by Siegel and Greenberg (1953) for New York. In only 82 out of 7782 households in which there was a patient with paralytic poliomyelitis was there a second paralytic case. The difference between the numbers for houses with paralytic cases only, and for those which included non-paralytic cases, is not unexpected, in view of the uncertainties of diagnosis of non-paralytic poliomyelitis and the lesser likelihood of it being notified.



Distribution of serial intervals in households with 2 cases of poliomyelitis, classified according to type of cases.

TABLE III—DISTRIBUTION OF SERIAL INTERVALS IN HOUSEHOLDS WITH 2 CASES OF POLIOMYELITIS, CLASSIFIED ACCORDING TO TYPE OF CASE

Serial interval (days)	No. of households				
	2 paralytic cases	2 non-paralytic case	Non-paralytic, then paralytic case	Paralytic, then non-paralytic case	Total
0	8	11	→ 8 ←		27
1	12	5	2	4	23
2	7	7	1	2	17
3	4	10	4	3	21
4	7	6	1	2	16
5	4	5	2	2	13
6	5	5	5	8	23
7	3	5	3	1	12
8	6	3	2	5	16
9	2	1	2	2	7
10	4	2	1	2	9
11	0	6	1	1	8
12	2	0	1	4	7
13	2	1	1	5	9
14	2	1	..	3	6
15	1	..	..	1	2
16	1	1	..	..	2
17	..	1	..	..	1
18	..	..	..	..	0
19	..	..	..	1	1
20	..	..	1	1	2
21	..	..	1	..	1
22	..	1	..	..	1
23	1	..	..	..	1
>23	0	1	2	2	5
Unknown	1	0	0	1	2
Total	72	72	31	57	232

Age and Sex Distribution

In table II the age and sex distribution of multiple cases is given, classified as to whether they were primary or secondary. The primary cases include double and triple primaries. It will be seen that there is a curious deficiency of girls aged 6–10 years, which is especially noticeable among the primary cases and for which there is no obvious explanation. This is counterbalanced to some extent by an excess of female adults among the secondary cases. It is reasonable to explain the latter finding as due to infection of mothers by their children. Secondary cases are commoner in females than in males.

Serial Intervals

The distribution of serial intervals among various types of household with 2 cases is given in table III. In character it is very similar in households with 2 paralytic and those with 2 non-paralytic cases, but there seem to be differences between these and the mixed ones. In houses with 2 paralytic cases the 2nd case usually followed the 1st in a short time—about two-thirds of them within a week.

Twins

Investigations of twin cases made by Herndon and Jennings (1951), and of consanguinity in parents of paralytic cases by Wintrop-Oostenrijk (1955), have suggested the existence of a genetic factor influencing susceptibility to paralysis. Addair and Snyder (1942) have even claimed that susceptibility may be determined by a recessive gene. On the other hand, the work of Borgström (1939) and Masini (1953) does not support this possibility. We examined our data for the frequency of twin cases to see whether they were present in sufficient numbers to support the hypothesis of a genetic factor. A rough calculation based on the Registrar-General's statistics of household size indicated that about 2–5% of twins might be expected by random sampling alone. It was found that, in 145 households with 2 cases aged less than 16, there were 10 in which the 2 patients had the same name and date of birth. Of 39 paralytic pairs 5 (13%) were twins, while the incidence in mixed and non-paralytic pairs was 1 in 53 (2%) and 4 in 53 (8%) respectively. The excess of twins in the paralytic pairs, though suggestive, is not statistically significant.

Other Characteristics

The general characteristics of multiple cases, apart from certain features of the age and sex distribution mentioned above, were similar to those of single cases. There was no peculiarity of their seasonal distribution, nor were there any obvious changes in the frequency of multiple cases during the four years over which the present data were collected. A recent history of inoculation or tonsillectomy was no commoner than in single cases. Multiple cases were slightly commoner in rural areas, 30% being found instead of the 22% expected from the Registrar-General's statistics.

DISCUSSION

The present study provides little evidence that paralytic cases tend to be associated with one another in households. In the whole of England and Wales during four years, there were only 82 households in which 2 or more paralytic cases of poliomyelitis were reported. In table IV the observed distribution of multiple cases is compared with that which would have been expected if there had been no association between the cases at all and they were random events in a uniform population of households. In these circumstances they would follow a Poisson distribution, and it can be seen that the observed and calculated distributions agree remarkably well. There is a significant discrepancy as measured by the χ^2 test, but this could easily be ascribed to the roughness of the hypothesis, which ignores variation in household size and other complications; in any case the χ^2 test is not reliable with distributions of this kind where the major discrepancies are found between very small expectations and their observed counterparts.

TABLE IV—COMPARISON OF OBSERVED DISTRIBUTION OF MULTIPLE PARALYTIC CASES IN HOUSEHOLDS WITH THEIR EXPECTED VALUES FROM THE POISSON DISTRIBUTION: HOUSEHOLDS WITH NON-PARALYTIC CASES EXCLUDED

No. of cases in household	No. of households	
	Observed	Calculated
0	...	...
1	7603	7600·6
2	72	77·0
3	3	0·4

The distribution of serial intervals is also difficult to reconcile with the existence of a strong association between paralytic cases. The distributions in table III relating to pairs of paralytic cases or pairs of non-paralytics are very similar to those that would have been obtained if the members of the pairs had been infected simultaneously by some common source. There is no evidence of the existence of a group of cases arising from the primary at about the time of the usual incubation period. This finding has also been reported by Littell and Smith (1955) on the basis of other data on the serial interval, and they have suggested that it could be explained if patients became infectious early enough in the incubation period. The work of Casey (1942) does not support this explanation, since it indicates that the infectious period is most commonly from three days before till three days after the onset of symptoms.

From a practical aspect the information given above suggests that, so far as a patient's home contacts are concerned, there is little value in quarantine measures or passive immunisation with γ-globulin. These could not prevent more than about 1% of all paralytic cases even if they were universally applied and completely effective, and every secondary case arose by infection from the primary. Furthermore, most secondary cases arise so soon that it would be difficult to take any action in time.

SUMMARY

Multiple cases of poliomyelitis, in households in England and Wales from 1951 to 1954, have been studied.

In 82 out of 7782 houses in which there was a case of paralytic poliomyelitis, there were 1 or more secondary cases. This distribution is similar to what would have been expected by chance alone.

About two-thirds of the secondary cases arose within a week of the primary.

Apparently there was no strong association between paralytic cases.

We are indebted to the Medical Research Council committee on inoculation procedures and neurological lesions for permission to use their records. We should like to thank Miss Eileen Bebb for her great assistance in the analysis, Dr. J. Knowelden for his help, and Dr. P. Armitage for advice and criticism.

REFERENCES

Addair, J., Snyder, L. H. (1942) *J. Hered.* **33**, 307.
Borgström, C. A. (1939) *Z. KonstLehre* **23**, 540.
Casey, A. E. (1942) *Science*, **95**, 359.
Herndon, C. N., Jennings, R. G. (1951) *Amer. J. hum. Genet.* **3**, 17.
Littell, A. S., Smith, G. V. (1955) *Amer. J. Hyg.* **61**, 302.
Masini, T. (1953) *Folia hered. path.* **2**, 115.
Medical Research Council (1956) *Lancet*, ii, 1223.
Siegel, M., Greenberg, M. (1953) *New Engl. J. Med.* **249**, 171.
Wintrop-Oostenrijk, G. A. (1955) Een onderzoek naar de invloed van endogene factoren bij de paralytische vorm van poliomyelitis acuta anterior. The Hague.

Poliomyelitis Vaccination

It was hoped that the distribution of poliomyelitis vaccine would start again this week and a batch sufficient to vaccinate 200,000 children with two injections was being made ready. But the Ministry of Health announces that information has been received from the manufacturers that signs of possible deterioration during storage have been detected in a few of the phials of vaccine that were ready for issue. It has been decided to defer distribution pending investigation. During the first phase of the programme last year some 200,000 children between the ages of 2 and 9 were vaccinated, leaving about 1,500,000 children in England and Wales still registered. These children are now to be given priority. In Scotland about 35,000 children were vaccinated last year, leaving 265,000 children still registered.

Medicine and the Law

Negligence Claim Fails

A SCOTTISH jury has unanimously rejected a claim against a doctor for alleged negligence in the injection of an anæsthetic.[1] The pursuer (plaintiff) was a Mrs. Sutherland. She alleged that, in giving her an injection of thiopentone ('Pentothal') before an operation, the doctor negligently caused the point of the needle to enter the median nerve of the left arm. It was alleged that as a consequence the patient suffered considerable pain in her left arm and hand from time to time, and that she had difficulty in raising her left arm to the height of her shoulder. She also contended that she had defective sensation in the tips of her left thumb and fingers and general clumsiness in her left hand.

The defence did not admit that the needle had in fact entered the median nerve, and it does not appear to have been proved that this happened. It was admitted, in view of the injury sustained by the patient, that some penetration of the nerve may have taken place, but it was contended that this was not due to any negligence on the part of the doctor. Two anæsthetists gave evidence to the effect that any piercing of the nerve could have been due to a completely involuntary muscular movement within the arm which the doctor could not have foreseen or have seen happening.

1. *Glasgow Herald*, Feb. 16, 1957.

Coma Mistaken for Death

A Mrs. L., aged 78, decided apparently to end her life by taking an overdose of drugs.[2] Her daughter found her in bed, and believed her to be dead. She sent for a doctor who was also of opinion that Mrs. L. was dead. The body was removed to a mortuary, no sign of life being observed during the journey to the mortuary. As the undertaker and a police officer were leaving the mortuary, however, the officer noticed that some cotton-wool which had been placed on the woman's face had slipped. The undertaker returned and saw that she was breathing. Resuscitation apparatus was called for and applied while she was taken to hospital. She died later at the hospital.

Giving evidence at the inquest, Prof. J. M. Webster said that death was caused by hypostatic pneumonia due to acute narcotic poisoning. Mrs. L. had taken about three times the lethal dose. In thirty years' experience, it was only the third case he had known where coma had been mistaken for death and the patient removed to a mortuary.

Professor Webster said that the case was a particularly difficult one, because it was in an old lady and the narcotic drugs depressed the vital nerve centres, particularly the respiratory senses. In the coma Mrs. L. had been almost dead, with no pulse at all, and it was a perfectly reasonable mistake to say she was dead. The case was almost hopeless from the start owing to the amount of drug absorbed.

Parliament

Royal Commission on Remuneration

ON Feb. 20, in the House of Commons, Mr. HAROLD MACMILLAN, the Prime Minister, announced the appointment of a Royal Commission to review the remuneration of doctors and dentists. He said:

The House will know that a claim has been submitted for an increase of 24% in the remuneration of all doctors in the National Health Service. The extra cost to the country would be about £20 million a year. In present circumstances, the Government do not feel able to admit this claim, and representatives of the profession have been so informed.

This does not mean that the Government have reached any conclusion as to the merits of the claim. Indeed, they have decided that the time is opportune for a full review of medical remuneration through an independent inquiry which would take into account the position of the medical profession in relation to other professional classes in the community, and would suggest how the matter could be kept under review.

Within the last few days a claim, similar to that of the doctors, has been received on behalf of the dental profession, and the dental profession will be included in the review to be conducted by the Royal Commission. The question whether the remuneration of doctors and dentists employed by local authorities should be included in the terms of reference is under consideration.

I will announce at a later date the names of the chairman and members of the Royal Commission, together with the terms of reference.

Mr. HUGH GAITSKELL: Would the Prime Minister clarify the position? How long does he expect it will be before the Royal Commission reports? Is it to be in the nature of an arbitration tribunal which is to pronounce upon the claim? If so, are we to understand that the Government bind themselves in advance to accept whatever recommendations are made by the Royal Commission? Will the terms of reference include specialists as well as general practitioners? Finally, will it be within the terms of reference of the Commission and within its powers to recommend back-dating the award, if there is an award? The PRIME MINISTER: It will, of course, be in the power of the Royal Commission to recommend that any award or any proposal should be made retrospective, but we must await the recommendations of the Royal Commission on that point. The terms of reference will include the specialists. I believe that the character of the Royal Commission will be best set out in detail when I am able to present both the names of the members and the precise terms of reference, but I think it is generally agreed that it would be a good thing if the relation of this profession with other professions could be established and if a satisfactory system could be laid down by which future reviews could be carried out from time to time. I think it would be to everybody's benefit if that resulted from the Royal Commission.

Sir IAN FRASER: While welcoming this proposal, may I ask whether the remuneration of medical auxiliaries such as physiotherapists, radiographers, and others who work so closely with the medical and dental profession, could be included in the Commission's considerations? The PRIME MINISTER: I should prefer not to answer that today, but to take it into account when the terms of reference are settled.

Mr. HERBERT MORRISON: Does not the Prime Minister think that this is a very doubtful way of seeking to settle wages, salaries, and remuneration? Does it not take negotiation, from the taxpayer's point of view, out of the hands of Ministers who are responsible to the House and put it in the hands of an outside body? Is it not unlikely to lead to coördinated responsible decisions? Does the Prime Minister recall—I admit that this happened under the Labour Government—that the Spens Committee, dealing with somewhat similar circumstances, landed the country into an expenditure and into repercussions which were very embarrassing? The PRIME MINISTER: This is a very difficult problem, but I feel that the work of the Royal Commission on the Civil Service, which is not quite similar but is somewhat parallel, has been an advantage. Again, it was a question in which Ministers were finally responsible, as they will be in this matter, but I think that it has been an advantage in the general life of the Civil Service. If some equally good results followed from this Royal Commission, I think it would be generally acceptable.

Mr. G. D. NABARRO: May I ask the Prime Minister to make it perfectly clear, in framing the terms of reference for the Royal Commission, that a primary purpose should be to endeavour to eliminate all the legal and other uncertainties which have arisen during the past few years from the Spens report and the Danckwerts award made under it, all of which are responsible for the present difficult position with the doctor? The PRIME MINISTER: One of the purposes of the Royal Commission will be to clear up this situation and to lay down a system which, through the years, will be more workable and more acceptable.

Dr. EDITH SUMMERSKILL: As this is virtually a repudiation of the recommendations of the Spens report, could the Prime Minister say what was the reaction of the professional organisations towards this new suggestion? The PRIME MINISTER: The discussions between the representatives of the profession and the Minister of Health are another matter. Today, I have simply preferred to confine myself to stating that I have recommended the appointment of the Commission, that Her Majesty has been pleased to accept the recommendation, and that the terms of reference and the membership will be announced. I think that all the detailed questions had better be put to the Minister responsible.

The appointment of the Royal Commission was announced in the House of Lords by the MARQUESS OF SALISBURY. In receiving the statement for the Opposition VISCOUNT ALEXANDER OF HILLSBOROUGH admitted that the statement's first impressions on him were not very cheerful.

2. *Birmingham Post*, Feb. 19, 1957.

Having regard, he continued, to the long, outstanding application of the great profession of medical men and women to the State service, I feel it is extraordinary that, after this length of time, the question of their remuneration should be referred to a Royal Commission. Here we are dealing with something which is urgent, outstanding, and necessary to retain the good will of the medical profession in maintaining a great national service to the people. To me, it seems like cowardice on the part of the Government for them not to deal with, and decide their policy upon, what is an urgent matter.

There was no such reference to a Royal Commission, no such delay, before the Government made the statement in the other place the other day about the increased costs of welfare milk and the weekly contribution of the worker to the health service as there is going to be in regard to the remuneration of the doctors. But here it looks as if the medical profession may be "got at" with a view to putting up with a Royal Commission. Having regard to his former association with the great medical profession, no doubt the Chancellor of the Duchy of Lancaster will be busy trying to spin the necessary story of glamour to his professional colleagues.

The MARQUESS OF SALISBURY: This is a very wide and complex question. It is no good the noble Viscount and others saying that the medical profession can be dealt with entirely in isolation; it cannot be done. This is one of the most complicated questions that exist, as I know from my connections with the research bodies in this country, and it is an eminently suitable question to be dealt with by a Royal Commission.

VISCOUNT ALEXANDER OF HILLSBOROUGH: How long did it take the Government to discover that this was so complicated a question in comparison with others? For months and months this matter has been under discussion with the medical profession, and it has certainly been within the knowledge of the Ministry of Health from the moment that the State scheme was launched. Now, at this stage, when the doctors are in a very poor position—at least, some of them are—in relation to the increasing cost of living, that they should be dealt with by means of a Royal Commission seems to me almost unthinkable. Will the noble Marquess say whether, while the Royal Commission is sitting, any adjustment is going to be made to ease the position of the doctors? The MARQUESS OF SALISBURY: I understand that my right honourable friends the Minister of Health and the Secretary of State for Scotland have told the doctors and dentists that they are willing to agree to the granting of an interim increase to the junior hospital medical and dental staff. This is on the basis that they can justifiably be regarded as underpaid at present. The offer will be negotiated through the established Whitley machinery. It will not be extended beyond this limited class to, for example, the lower-paid general-practitioner doctors or dentists; it is meant to apply to those who are in most need at the present time.

LORD AMULREE: I must agree that the questions raised by the medical profession have been going on for a long time and I hope that the Royal Commission will now settle them quickly. I very much hope that the position of local-authority doctors and dentists will come under the terms of reference of the Royal Commission. This is a matter of some urgency, and I trust that this Royal Commission will report in six months and not a longer period. The MARQUESS OF SALISBURY: My Lords, the period which the Royal Commission will take is a matter for the Commission. The Government desire that it shall be as rapid and efficient as possible in its work.

LORD CONESFORD: May I ask my noble friend whether, in settling the terms of reference of the Royal Commission, he will consider the advisability of making them wide enough to enable the Royal Commission to compare, not only professional earnings as between different professions, but professional earnings with non-professional earnings? The MARQUESS OF SALISBURY: I have said that there must be some limitation of the terms of reference, even of a Royal Commission.

*** This matter is carried further in correspondence reproduced on p. 470.—ED.L.

Paying for the Welfare State

On Feb. 19, on the eve of the publication of the Civil Estimates for 1957–58, Mr. PETER THORNEYCROFT, Chancellor of the Exchequer, said that its total was £2654 million, an increase of £110 million over this year. Large items in the increase were for education (£63 million) and the National Health Service (£49 million). As a whole the social services showed an increase of £146 million over the original Estimates for this year. This was largely due to higher prices, salaries, and wages, but in part it was due to there being more children to be educated and to the increasing use being made of the National Health Service. The large and continuing increase in our total expenditure, he continued, imposed a burden on the economy which the Government could not ignore.

It would not be right to meet our difficulties by making changes in defence policy alone, and there must also be changes of policy on the civil side. Changes in local-government finance had been announced. The Government had also decided to reduce the subsidies for welfare milk and school meals. The price of welfare milk would be increased to 4*d.* a pint—that is, roughly half-price. This would leave the subsidy at about the amount per pint at which it was first introduced in 1940. With a corresponding increase in the price of National dried milk, the saving in 1957–58 would be £14 million. The charge for school meals would be increased by 2*d.* to 1*s.*, saving £3½ million. Both these changes would take effect from the beginning of April. The existing arrangements for hardship exemptions would continue.

Turning to the National Health Service, he said that the Government had given anxious consideration to its growing cost. When the service was introduced it was expected to cost a total of £175 million a year. By 1949–50, this had risen to £450 million. In 1950 a ceiling of £400 million was imposed on Exchequer expenditure, below which the cost of improvements and extensions to the service had to be contained. In 1957–58, the total cost of the service would be £690 million. Towards this, as things stood now, £40 million would come from the contribution made from the National Insurance Fund, which was 10*d.* a week for the adult man and lesser sums for other contributors; £100 million would come from other receipts (including charges to patients); and the whole of the balance of £550 million—£49 million above the estimate for last year—would be provided by general taxation.

The alternatives to this increase in the charge on the Exchequer were to reduce the scope of the service, to charge more to patients, or to increase the contribution. It was widely believed that the National Health Service was paid for by weekly contributions. He wished to make it clear that this was not so. The contribution had never paid for more than a small proportion of the cost of the service, and this proportion had steadily declined each year. When the original National Health Service Bills were before Parliament, it was expected that contributions would provide about a fifth of the gross cost of the service. Today, they provided only about a seventeenth. The Government, therefore, proposed to increase the contribution by 10*d.* for an adult man, and by smaller sums for adult women and juveniles. The employer would pay the same proportionate share as at present. The Government's purpose was to establish a separate National Health Service contribution towards the cost of the service. Next year, the contributory element would rise from a seventeenth to about a ninth of the gross cost of the service. Separate legislation for this purpose would be introduced as soon as possible. The change would provide an additional £40 million for the Exchequer in a full year. In view of the rise in the cost of the service he did not think it unreasonable to go back to what was a traditional arrangement—for people to contribute a little when they were well in order that they might be looked after when ill.

Members suggested that the increases would fall heaviest on families with small children but the SPEAKER reminded them that these matters would be debated on the Estimates. Mr. THORNEYCROFT added that the Government had given careful thought to these points.

but the worst damage that could be done to the social services would be to allow their cost to rise to unmanageable proportions.

Pension Adjustment

On Feb. 25, Mr. H. A. MARQUAND called on the Government in their next Budget to increase retirement and old-age pensions and adjust the scales of National Assistance. One of the recognised criteria of the adequacy of pensions and benefits was the number of people dependent on them who were obliged to draw National Assistance. At the end of last year, he said, this figure stood at 927,000, which in his view justified an increase. Another reason for an increase was the continuous rise in the cost of living. Since April, 1955, it had risen by 9%. He believed that in future there must be a much closer relation between pensions and the level of wages. Means must be found to protect pensions from erosion by inflation. He reminded those who said that an immediate improvement in pensions and benefits would throw too heavy a burden on the Exchequer that State support for privately financed superannuation was about £175 million against £137 million for National Assistance.

In all, 2½ million people were now dependent on National Assistance and he was uneasy about their standard of living. For instance, he did not see how the present rate of 18*s.* for a child between eleven and sixteen could be fair when a foster parent received 32*s.* He thought that we should have an authoritative commission to lay down minimum physical standards and set up a cost-of-living index based on these findings.

Miss EDITH PITT, joint parliamentary secretary to the Ministry of Pensions and National Insurance, maintained that, though the cost of living had risen, pensions had a better purchasing power today than at any time for the past seven years. National Insurance benefits, including pensions, were not, she continued, payments according to needs or means. They were paid as a right in return for contribution, and if we were to increase benefits we must also consider increased contributions. The Government had no money except what was raised from taxation or contributions. Not only must we consider what we could afford but also the burden we were placing on succeeding generations. There were today about 4,600,000 retirement pensioners; by the end of 1980 there would be 7½ million. To give a £3 pension now would cost an extra £220 million a year, which was equal to 4*s.* on the joint contribution. In twenty-five years it would amount to £370 million or 7*s.* on the contribution.

Turning to the question of nutrition she said that many old people who were found to be lacking food were not short of money but had no friends or relatives to help them. According to the National Food Survey for April to June, 1956, the old-age pensioner spent 25*s.* 5*d.* a week on food compared with 28*s.* 4*d.* per person in all households. She did not think that the allowance paid for a foster child could fairly be compared with an allowance for a child living with its family. The boarded-out child went to strangers and some payment was made to them for their care. She believed that the Government had protected pensions and benefits and would continue to protect them.

QUESTION TIME

Cost of the National Health Service

In answer to a question, Mr. DENNIS VOSPER, Minister of Health, said that the total cost of the National Health Service for Great Britain in 1949–50 was about £450 million, of which £345 million was met by the Exchequer. The corresponding figures estimated for 1957–58 were about £690 million and £550 million respectively. The equivalent of these latter figures in terms of the purchasing value of the £ in 1949–50 (measured by the estimated change in the Consumer Price Index between 1949–50 and December, 1956) were about £515 million and £410 million.

Mental Diseases and Alcoholism

During 1955 there were 1053 admissions to mental hospitals in England and Wales which were recorded as principally due to alcoholic psychosis or alcoholism. No estimate can be made of the number of admissions to mental hospitals in which alcohol was a contributory cause.

In England Now

A Running Commentary by Peripatetic Correspondents

AMONG the blights of a casualty officer's life, the common tramp looms large. Joshua Smallpiece was the exception to prove the rule.

He looked about 80, but he might have been 100 for all we knew. He had a grey verminous beard which reached down to the waist and he wore dirty old rags for clothing. After his first admission, these were hastily burnt and he complained bitterly about this affront. Neither boots nor socks, he claimed, had left his feet for two-and-a-half years, and the students who had assisted in their removal saw no reason to doubt his word.

In his way, he was a great naturalist. His favourite resting-place lay under the bridge by the river, and in time even the records department came to recognise this as his official residence. He lived with the birds and the trees and suffered with the elements. In the summer he had sunstroke, in the winter frostbite; the spring showers brought crippling arthritis, while November would bring him cyanosed and gasping feebly, as the fog seeped through his lungs. One icy Christmas day, he slipped and broke his wrist. The nurses did a wonderful job disinfesting his beard, and he was the best Father Christmas the hospital has ever known.

Joshua never outstayed his welcome. The first sign of recovery would find him sitting in the grounds on the old wooden bench, throwing crumbs to the pigeons. We sometimes thought they knew him, for there were always more of them when he was about. But as soon as the strength came back to his legs, nothing would hold him; with his stick and his bundle, he was off on the road, and the long shaggy beard would once again become a familiar sight by the river's edge. He had a strange superstition concerning his beard, for he would never allow a single hair to be cut. "The day you take my beard off, I die," he said. He looked as if he meant it and his wishes were respected.

One thundery autumn day, he was brought in unconscious, the victim of a stroke. For two days he lay in coma, the long grey beard trailing over his paralysed body like a bale of tow. The ward was busy and staff was short. "Shave the old man in the corner," called the nurse in charge. But the ward had four corners, an old man in each. It was too late. Joshua's features, seen by us for the first time, showed a ghostly pallor, his expression terrible reproach. That evening he wept like a child, and by midnight he was dead.

* * *

In our outpost of Empire the cinemas of the town are out of bounds; film shows therefore come to us. Our cinema, at other times the company dining-hall, is formed by the end-to-end anastomosis of a series of Nissen huts; internally it is reminiscent of the Bakerloo or prophetic of the airliner of the Future. We were agreeably surprised to find one day before Christmas that a film so recent as *Rock around the Clock* was to be our fare. The shambles reported in towns in England was not for us; the presence of N.C.O.s in force and the extremely durable furniture militated against this; still, there was nothing half-hearted in our rendering of "See you later, alligator."

Next morning the viva examination for operating-theatre technicians was held. Sister presided behind a table on which a selection of surgical instruments was laid out for identification. A candidate was handed an instrument and his opinion sought; with only the faintest suspicion of a smile he replied "Dura mater elevator."

* * *

"How's your back?" our orthopod asked solicitously as he got into the lift with me. And well he might; for, but for his present girth, he would have stood in my place on the stage during our Christmas show.

It is not easy for the tyro to wait for the laugh of recognition, or a sympathetic titter, after the long pause when he has sucked his teeth slowly, flexed and extended his knees that inch or so from the stand-at-ease to the stand-easy. I was clad only in white paint, plenty of black eye-shadow, and short-sleeved long woollen combinations, and it seemed to me an age before our orthopod

introduced me in stentorian tones as LITTLE MR. BIG. Then simulating utter weariness I presented the arms-bend position and gazed slowly in turn at each of the small biceps bumps formed. (I may mention here that I am very thin.)

I had been told to slow up my movements even more if I found the audience "dead," which I did. Also as a face-saver to turn my back ("Show your gorgeous trapezii, old boy") on the audience and still with arms bent do a slight gyration with the hips. Many years ago this had gained a coarse guffaw from the rear of the hall when the orthopod had saved the same turn from going sour. He assured me it would start a laugh riot and panic the audience. Unfortunately, without benefit of rehearsals or stagecraft, it was I who panicked, and without waiting any longer I started, with a quick nod to the pianist, a too quick rendering of *You too can have a body like mine*. At the third line I had lost the artificial quavering croak which had taken a lot of bathroom practice and I searched my vocal chords to resuscitate it without success. Leaving the pianist behind, I now gained speed and forgot to gaze in meditation at my navel for the long pause after *make your liver shiver and your kidneys quiver*.

In the corner of my eye I noted restlessness in the wings as well as in the audience, and I started on the deep-breathing exercise ("It has to be done very, very slowly, old boy; it's the punch moment of the whole item"), which our orthopod said would tie everybody in knots providing I gained the audience's confidence. Neither I nor the audience had any confidence, and the deep breathing degenerated into short pants. Once more I hurried into the refrain and began to sense escape was near.

I shuffled to the cunningly dispensary-painted "plaster-of paris" bar-bell weights which had been placed front centre-stage only to find that the orthopædic department had left a genuine 60 lb. on each end of the bar. As I swore and tore to raise it for the "snatch, clean and jerk" I felt the ominous click and the sharp pain in my back. Bent double I made my exit holding up one end 18 in. from the floor.

The gratifying roar that resounded on my disappearance was due, I was told later, to the beaming genial aplomb of our orthopod, who, exhaling good cheer and sparing me the insult of the desultory clap, swung with a crash of opening bars straight into *I'm the man who found The Lost Chord*.

* * *

The B.B.C. News Service had just told of last month's earth tremors. A professor of geology from the Midlands was reported to have said that the shock wave was so severe that it "nearly threw him from his chair." A colleague commented that if this was the usual effect of earthquakes then our little university town might well benefit by a series of seismic shocks.

* * *

The dominant gene, the dominant gene
Is the happiest creature that ever was seen;
We mortals can only admire at a distance
The joys of a chromosomatic existence—
Or marvel how Nature determines the sexes
By cunningly mixing the Y's and the X's
(For, as Mendel has proved, it is only statistics
That settle our primary characteristics).
Just imagine the life of ineffable bliss you
Could spend as a speck in the nuclear tissue!
Fraternally twinned with a charming recessive—
Your relationship tender, but firmly possessive;
Dictating the pigment, the shape of the nose,
Or whether your host shall have suckers for toes.
Do you find immortality's promise seductive?
Make your home in a cell that is marked "Reproductive."
A short life, but merry? You dread being static?
Your calling is plain—you are clearly Somatic—
For you cannot grow stale, with your every ambition
Fulfilled by perpetual cellular fission.
So banish your doubts, your neuroses, and revel
In life as it's lived at molecular level!

Envoi

Princess! You'll discover the key to my riddle
By shuffling two chromosomes—split down the middle.

Letters to the Editor

BRONCHIAL CARCINOMA

SIR,—Mr. Thompson, in his letter last week, draws attention once more to the delay in referring patients with cancer of the lung to the surgeon. One reason for this delay will be appreciated by all whose task it is to recognise cancer of the lung among other diseases with identical presenting symptoms and radiological findings. They see many patients with persistent cough due to a respiratory infection, pulmonary consolidation resolving slowly but permanently under treatment, and blood in the sputum the source of which is an acutely inflamed bronchial mucosa. Any one of them may be suspected for a time of having cancer. If they were all sent to a thoracic surgical department without preliminary sorting, the surgeons would soon find themselves overwhelmed. Mr. Thompson's figures, illustrating the slow progress of his patients from the general practitioner to the surgeon, cannot therefore be seen in perspective unless we know the size of the sick population from which they were drawn. For every one of his 135 patients with carcinoma of the lung there must have been many others who did not go beyond the general practitioner or the chest physician, because they were found to have some less serious disease during the seemingly long period of observation.

Just over a year ago a group of six general practitioners agreed to refer to me every man aged 45–70 years who had been a heavy smoker as soon as he reported one of a previously defined set of symptoms suggesting the possibility of bronchial carcinoma. The number of patients referred to me under this arrangement in 1956 was 56. Amongst these I found 2 with bronchial carcinoma, only 1 of whom was in a fit state to be referred to the surgeon. It was often impossible to settle the diagnosis at the first consultation, and many patients were seen several times before being dismissed from observation. If Mr. Thompson's suggestion had been adopted, he and his colleagues would have examined over 7500 patients, many of them more than once, in order to find 135 cases of cancer of the lung. This conservative estimate is based on the assumption that his patients were also selected from a similar age-group of men at special risk.

The special techniques available to thoracic surgeons, by which Mr. Thompson probably means facilities for bronchoscopy and thoracotomy, are readily accessible everywhere. The difficulty is to know when to use them. Most patients find bronchoscopy too unsettling an experience for it to be used on the large scale necessary for efficient case-finding. Nobody would wish to rely on thoracotomy as a means of diagnosis except as a last resort. There is no such objection to a search for malignant cells in the sputum, but this examination demands great skill and is time-consuming. It remains to be seen whether it is economical to provide such a service on the scale required for general use.

It would be unprofitable to discuss whether this or that class of doctor is better qualified to recognise cancer of the lung in its early stages. If the arrangements we are testing on a small scale were extended to the whole population, the work involved would overstrain the resources of any one specialty.

Queen Mary's Hospital,
Sidcup. PAUL FORGACS.

SIR,—It is extraordinary to find such a distinguished surgeon as Mr. Vernon Thompson blaming the medical profession for the failure to diagnose lung cancer earlier and making the misleading suggestion that the present tendency "to refer chest cases to chest clinics, which have evolved from the old tuberculosis dispensary, in

order to get an X ray, has contributed largely to the delay."

It is surely common knowledge that when patients complain of respiratory symptoms, elucidation of their condition requires a chest X ray. Indeed, as Mr. Thompson himself says, "radiology is now an essential part of clinical examination," and today the overwhelming majority of general practitioners know this and refer their patients liberally to the most convenient centre. All over the country efficient chest clinics are now in existence doing this work, and, owing to the recognition of the importance of radiology, enormous strides have been made toward the earlier and effective diagnosis of all pulmonary conditions.

Mr. Thompson cannot be serious when he suggests that "general practitioners who suspect that their patients have carcinoma of the lung should be encouraged to send them direct to surgical centres. There are enough fully trained thoracic surgeons to deal with the problem." Does Mr. Thompson really suggest that general practitioners should send all their patients with cough or sputum or hæmoptysis or dyspnœa or chest pain to such thoracic surgical centres for investigation? There are less than one hundred consultant thoracic surgeons in England and Wales. It is quite certain that every consultant thoracic surgeon would be so swamped with such diagnostic work that he would at once cease to have any time to operate. At this clinic, a general practitioner can obtain an X-ray report on any patient within twenty-four hours without making a special appointment. In 1955, over 2000 patients were referred to this clinic complaining of respiratory symptoms. A large proportion of these had symptoms which are common to lung cancer and to other lung diseases.

Unfortunately Mr. Thompson bases his illogical argument on 135 selected cases of lung cancer which had found their way to a single teaching hospital in 1954. It is well known that patients who find their way to teaching hospitals commonly do so because they are not straightforward cases, and the conclusions to be drawn from such a series must be interpreted with that in mind. It is astonishing that Mr. Thompson quoted 3·8 months as the average interval between a patient seeing a chest physician and coming to his department. We find it difficult to believe that such a state of affairs in any way represents common clinical practice in England today. If any one of us had a patient who could not be bronchoscoped at any thoracic centre within a fortnight on our recommendation, that patient would straight away be referred elsewhere for bronchoscopy, but in practice we enjoy the closest coöperation with the thoracic surgeons with whom we are associated.

The earlier diagnosis of lung cancer, as of pulmonary tuberculosis, is to be achieved by the wholehearted coöperation of every branch of the medical profession together with highly efficient hospital organisation in regard to outpatient appointments and inpatient investigation.

W. H. TATTERSALL
D. J. APSIMON
A. T. HENDRY.

Bournemouth Chest Clinic.

SIR,—Mr. Thompson's strictures about procrastination by chest physicians when diagnosing carcinoma of the bronchus have led us to examine from this angle all our cases diagnosed in 1956.

We serve a population of about 300,000 from which general practitioners have free access to our X-ray-only service. 8605 patients were sent up of whom we recalled 381 for clinical examination, and 43 were finally diagnosed as carcinoma of the bronchus (this includes cases referred direct for appointment). In these 43 cases the average time from initial X-ray until bronchoscopy was $2^1/_2$ weeks and the further interval until thoracotomy was $2^1/_2$ weeks. Much of the credit for these figures is due to our surgical colleagues for their close coöperation.

There can be little room for criticism of delay in these figures, and in fact about half the delay before operation is the time awaiting a surgical bed once bronchoscopy has confirmed the diagnosis. It would be interesting if Mr. Thompson's figures could be completed by giving the average interval from diagnosis until thoracotomy, as in our experience this even if unavoidable, is not always negligible.

While we feel justified in doubting whether any other method would reduce delay still further, we must admit that 2 of our cases had previous films at the clinic about a year and two years before, and on looking back we had obviously missed the small original lesion. We are aiming to avoid this in future by independent double reading of all new films, but do not feel it affects the present argument.

We would, however, be very willing to have instruction from the character who apparently in Mr. Thompson's estimation could have picked out on one small postero-anterior film the 20 cases which should be referred for surgery out of the 381 recalled for examination. It took us much time with further radiological, clinical, and pathological examination, not to mention about 80 bronchoscopies, to weed out these 20 apparently operable cases. Any shortening of the process would be welcome.

We understand that each thoracic surgeon serves about half a million of the population, and it is quite unrealistic to suggest he could tackle this preliminary sifting of cases as well as perform the surgery.

Thoracic surgeons are peculiarly fortunate among their surgical brethren in having most of their cases presented to them already worked out by physicians. This leads to a rather Olympian outlook, and we would warn them that a descent to primary contact with the patient might lead to humiliation; they too might be subject to observer error.

P. H. SUTTON
A. H. C. COUCH.

Isolation Hospital,
Norwich.

SIR,—Every thoracic surgeon in this country will sympathise with Mr. Frank Nicholson (Feb. 9) and Mr. Vernon Thompson in their anxiety to improve the diagnosis of this dread and relentlessly increasing disease.

There still seems to be a proportion of family doctors who regard bronchial carcinoma as a sufficiently uncommon disease not to consider it in patients presenting with an acute respiratory illness for the first time in their lives, or in those complaining of a cough or wheeze, hæmoptysis, "tightness of the chest," or even frank dyspnœa. I have purposely excluded pain from my list of important symptoms, for I have come to regard it as a late and sinister feature indicating inoperability in many cases.

It is interesting to notice how many patients are becoming aware of facilities available to them, and after a period of treatment from their own physician have themselves requested a radiograph only for an inoperable growth to be discovered.

Admittedly there is a risk that a tuberculosis-minded physician may lose time watching the effect of anti-tuberculous drugs on a radiological shadow, perhaps caught off his guard by the finding of tubercle bacilli in the sputum, whereas a simple inspection through the bronchoscope would have revealed an unsuspected concomitent tumour. I would hesitate, however, to throw the weight of diagnostic responsibility on to the radiologist on whose report the family physician may have to depend. Very few radiologists have the time or the facilities to conduct a careful appraisal of the patient's history and symptoms, and still less to examine him clinically, steps which may be of critical importance, and are, therefore, tempted to fall back on the formula

of a "follow-up examination in 4–6 weeks"—a process which, if two or three radiologists are each reading films in a busy department, may add several months to the diagnostic time.

What is the answer? Some years ago Sir Russell Brock advised that any patient over the age of 40 suffering from an attack of pneumonia ought to have a chest X-ray before returning to work. I venture to suggest that over the age of 30 would be even better. Furthermore, one notices nowadays that the astute physician seeing a patient who is presenting with symptoms referable to the chest for the first time, or with a change in his respiratory history, now arranges for a radiograph, and if an abnormal shadow is visible on the films he then refers his patient to a thoracic surgeon for an opinion. This course of action does, I believe, conform with Mr. Thompson's criteria of making the full range of diagnostic facilities, by bronchoscopy, bronchography, and if necessary thoracotomy, immediately available to the patient and may save a great deal of valuable time in treating a disease which manifests itself with unpleasant frequency at a distressingly late stage.

Victoria Hospital, Blackpool. P. JEWSBURY.

UNMARRIED PARENTHOOD

SIR,—Dr. Comfort's letter (Jan. 26) was most welcome. The problem of unmarried motherhood is, however, part of a larger problem—that of the unwanted child. The desirable situation is that every child should be positively desired. Ignorance of contraception not only causes undesired extramarital pregnancies, it also causes many unwanted children to be born in wedlock. And while it is probably true that most mothers come to accept these pregnancies in the end (only a minority of the babies so conceived come to be classed as rejected children), yet there is a world of difference between such acceptance and the joyful welcome of a child whose conception was positively desired.

Furthermore security in the matter of contraception extends a beneficial effect far beyond the question of desired or undesired pregnancies, for it provides the basis for a sexual life freed from such anxieties. Family doctors of discernment have known many cases where family life has been disrupted by pregnancy anxiety with its attendant destruction of sexual fulfilment, and a high proportion of the illnesses which stem from anxiety can be traced to this same pregnancy anxiety. Coitus interruptus has long been known to exert a baleful effect upon those who practise it; yet the prevalence of this crude method is itself an indication of the ignorance regarding more rational and æsthetic techniques.

The field of medicine in which knowledge of reliable contraceptive techniques can be of profound help is therefore enormous. The family physician is the obvious person to disseminate information and create a healthy attitude, but he is severely handicapped by the fact that the teaching hospitals do not regard it as their responsibility to give any guidance to students about contraception (as far as I know, University College Hospital is the only London teaching hospital to have a contraception clinic). Even today it is not unusual for women to be advised by gynæcological clinics against further childbearing without any advice being added as to how pregnancy is to be avoided. This has happened several times in my practice despite the existence of an excellent birth-control clinic in the district. The training of doctors in contraceptive techniques is undertaken by the Family Planning Association, but it is left entirely to individual doctors to discover the usefulness of such knowledge, and to decide to acquire it. Here is a field in preventive medicine which is largely unrealised, but which can yield rich results in helping to prevent unhappy homes, and the bringing into the world of unwanted or only half-wanted children. It is to be hoped that those in charge of medical education will soon realise their responsibilities in this matter.

London, S.E.1. JOHN HEWETSON.

BIRTHDAYS OF SPASTICS

SIR,—Dr. R. T. Bevan's letter of Feb. 16 prompted me to review the birth dates of 227 known spastics born in the years 1940 to 1953 in the County of Stafford.

The monthly incidence from January to December was: 17, 20, 21, 18, 27, 26, 21, 12, 15, 15, 17, 18. These figures do not show the distribution recorded by Dr. Bevan, for in the period December to March 76 cases had their birthdays whilst the period June to August accounted for 59 cases. The lowest incidence in this series was in the months July to September—42 cases.

Wolverhampton. C. SIMPSON SMITH.

PRACTITIONER AND LOCAL AUTHORITY

SIR,—I was somewhat puzzled by a phrase in your leading article of Feb. 2 "And, if one can judge by the correspondence in our columns, most doctors think . . ." One would accept this level of reasoning in The Widdicombe File but not in your editorial columns.

I believe the number contributing to the correspondence was 26. What proportion of 26 supported the original anonymous contributor is evidently a matter of opinion. I thought the balance was remarkably evenly held, even without allowing for the relative numbers of general practitioners and of local-authority medical officers in the profession.

My quarrel with your phraseology is that neither the total of 26 nor any part of it constitutes a significant proportion of the medical profession. It could be that "most doctors" did not think an anonymous gibe was worth powder and shot.

Ethics have been mentioned. What of the ethics of blackguarding, under a nom-de-plume, a section of the profession of which the writer admittedly knew little. All in fun? Perhaps, but from the young man's final contribution he evidently expected to be taken seriously. If, in the course of his professional career, he never comes across anything more unethical than clinic services he will be fortunate.

Galleywood, Essex. HILDA MENZIES.

THE Rh BLOOD-GROUPS

SIR,—I am sorry to prolong this correspondence, but Dr. Wiener (Feb. 16) has so grossly misquoted me as to require an answer.

I did not say that the use of "most likely genotypes" leads to paradoxes—far from it. My complaint was that he had interpreted one of his tables as if each genotype were a certainty instead of being one of several possibilities as the words "most likely" surely imply. There is in fact no paradox in either table, presented in either notation. All that can be said is that two of the tables are less complete than the other two (a fact clearly indicated in their headings). It requires neither legal nor scientific acumen to realise that they are unsuitable for paternity work where interest lies in impossibilities and not probabilities, however high.

I find it difficult to reconcile the beginning and the end of Dr. Wiener's second paragraph. He says that workers use the CDE system because they understand no other, but that they would find it easy to change because they already use the "shorthand" symbols and, therefore, have nothing fresh to learn. Really, Sir, he cannot have it both ways.

Dr. Wiener's third paragraph proposes an odd use for his nomenclature. He seems to be suggesting that it should be used to impress (and presumably baffle)

lawyers, who, he thinks, might suspect that a CDE user did not understand his subject. The reaction of an English barrister to evidence in Wiener's notation is easy to predict: "Thank you, Doctor. Now would you mind explaining to My Lord and the Jury in simple English just what you mean?"

Pathology Laboratory,
Essex County Hospital,
Colchester. J. W. NICHOLAS.

REMUNERATION IN HOSPITAL SERVICE

SIR,—Your correspondence columns have recently included letters in connection with the status and remuneration of pharmacists, laboratory technicians, and radiographers, and Mr. David White (Feb. 16) indicated that the discontent embraced the whole field of medical auxiliaries.

The medical profession itself is seething with discontent regarding its conditions and remuneration. Recent letters to the *Times* indicate that there are similar causes for concern over the remuneration of catering officers and chefs. Administrative workers are equally dissatisfied with conditions and rewards.

It is clear, therefore, that all who are working in the hospital branch of the National Health Service are dissatisfied with the rewards available for ability and effort, and I suggest that there is a great need for representatives of all branches of the professions engaged in the health service to meet with a view to presenting a general demand to the Minister for an early review of the whole question of remuneration to hospital service staffs, particularly with reference to the methods of negotiation.

Aylesbury, Bucks. RONALD MACDONALD.

THE DISINTEGRATIVE ACTION OF THE NERVOUS SYSTEM

SIR,—The Bradshaw lecture of Dr. William Phillips, published in your issue of Feb. 9, is a fine contribution to that holistic or integrative medicine which dominates contemporary thought and practice. We must be grateful to him for having again stressed the importance of the psychological factors in disease and of the consideration of the patient as a person, in a true Hippocratic spirit.

There is, however, a certain danger of swinging the pendulum too far, and this was pointed out at the Third International Congress of Neohippocratic Medicine. Even psychiatrists are beginning to return patients referred to them to the hospital departments from whence they came. The only way to avoid this danger is to insist on an accurate nosological diagnosis. We have to start our medical handling by labelling the patient and placing him under one of the morbid categories of nosology. The famous slogan of Peter "There are no diseases, but only patients" ought to change into "There are diseases *and* patients." History has shown that neglect of this first step in diagnosis renders all our subsequent individual consideration of the patient often useless. The failure of the German "physiological" school of the 19th century, so well described by Sir Francis Walshe in his Gowers lecture,[1] is a recent demonstration of that historical law. It is after an accurate nosological diagnosis that personalistic investigation, psychological, physical and environmental, has to be considered.

I am astonished, however, to note in Dr. Phillips's fine lecture that he is amazed that intelligent people consider that a classical education trains the mind in some unique fashion and that "the old ways of thought inherited from the Greeks and Hebrews, and modified at the Renaissance, will gradually change." Is not our integrated, holistic medicine of today based on our Greek classic, Hippocrates? Do we not find in Plato the principle that physicians to cure a local disease have to treat the whole body and mind? Do we not encounter in all ancient Greek medical observations the stress on social environmental factors, including worry about the payment of the fees? Can we find a better insight into the human mind than in the Greek tragedians, *The Bible*, and Shakespeare? Dr. Phillips accepts the opinion of Putman that a thorough preliminary course in psychology and philosophy, following close on chemistry and physics, is the best preparation for medical practice. The philosophy that has not been inherited from the Greeks and Hebrews is that of crossword puzzles that delights dons far removed from active life, and that which leads to inhuman totalitarianism and universal extermination. The philosophy necessary for us physicians is that inherited from the Greek thinkers, who were essentially men of action, in daily contact with the rough and tumble of life; and from the great Hebrew prophets, who opened our eyes to the transcendent and spiritual value of life. We have, of course, to augment that heritage, but we cannot do away with it if we do not wish our civilisation to be buried in the sands, like all those ancient civilisations that had done away with their spiritual values.

1. *Lancet*, 1956, ii, 1059.

London, W.1. A. P. CAWADIAS.

OBSTETRIC FLYING-SQUADS

SIR,—In the light of your annotation last week reporting the 21st anniversary of the Newcastle Obstetric Emergency Service, may I mention what, as far as I am aware, was the first "flying-squad" to be set up in the County of London?

In 1938, Prof. F. J. Browne, on behalf of the University College Obstetric Hospital, agreed to provide a hospital flying-squad for mothers in this borough. The staff of the unit comprised a physician of consultant standing, with three alternative consultants to act as deputies, one medical officer to act as assistant to the consultant, and one qualified nurse. The borough council also agreed to pay the hospital a fee of seven guineas for each occasion upon which the unit was called out. A report from the doctor or midwife calling out the unit was asked for as soon as possible, and the coöperation of the police was also obtained to cope with any possible difficulty in calling the unit.

The number of calls upon the unit was few at first, but increased as time went on, and there were nine emergency calls in 1946, and ten in 1947. The following two cases, taken from my 1947 annual report, are typical.

CASE 1.—The flying-squad was called at 11.20 P.M. The patient, aged 22, had been delivered of her first baby and immediately after delivery of the placenta there had been a very severe postpartum hæmorrhage with the loss of 80 oz. of blood. The patient was found to be in a state of collapse with a pulse-rate of 140 and blood-pressure of 80/50. Patient was given plasma and blood-transfusion, one pint of each, and morphine, and with this treatment she made a very satisfactory improvement and the flying-squad left the house at 1 A.M.

CASE 2.—The flying-squad was called at 10 A.M. and the unit arrived at the house at 10.20 A.M. The patient was found to be in a state of obstetric shock suffering from postpartum hæmorrhage. Her blood-pressure was 80/50 and her pulse-rate about 100. An immediate transfusion (group O, Rh negative) was put up and manual removal of the placenta was carried out under chloroform anæsthesia. The transfusion was completed and the patient received a a total of 420 ml. of blood and 500 ml. human serum. A course of penicillin and sulphathiazole was ordered. At 11.30 A.M. the patient's condition showed a great improvement, there being no further bleeding; the blood-pressure was 130/70 and the pulse-rate 110. The patient's general condition was satisfactory when the unit left the house at 11.40.

The borough council's arrangement for the flying-squad was terminated on July 5, 1948, when responsibility

for the personal health services passed to the London County Council as the local health authority under the National Health Service Act, 1946.

Public Health Department, Metropolitan Borough of Islington, London, N.1. V. FREEMAN Medical Officer of Health.

TOWARDS PREVENTING SUICIDE

SIR,—We should like to thank correspondents who have written concerning our paper "Towards Preventing Suicide." We set out to establish that more common admission to hospital is one effective answer to the increasing total mortality from suicide. To achieve this we concluded that changes must be brought about in public attitude and professional awareness. It was not our purpose in a short article to discuss either the ætiology or the prevention of suicide in a comprehensive way, and it was not suggested that admission to a mental hospital is the only worth-while preventive measure. If our figures are representative of what happens in the country as a whole, it means that of an annual total of about 5000 suicides, 2650 are not under medical care at the critical time, but 2000 are under medical care including 500 who have been seen by a psychiatrist but not admitted to hospital. Admission may have been advised and refused; and it may be the right decision in individual cases, after full assessment, not to advise admission to hospital. But these figures suggest that admission is not achieved sufficiently often, and either the patient or perhaps the doctor too often contracts out of the best proven method of preventing suicide.

R. W. PARNELL
IAN SKOTTOWE.
Warneford Hospital, Oxford.

DEPOT TUBERCULIN

SIR,—Last May Dr. James and Dr. Pepys described a technique for giving purified protein derivative of tuberculin (P.P.D.) in an emulsion of light liquid paraffin and anhydrous lanolin, as a tuberculin test.[1] This "depot tuberculin" remained in the skin for two or three months and became "positive" as the patient's allergy developed; or, if the patient was a positive reactor, it gave a reaction in forty-eight hours. The method seemed to have an important bearing on B.C.G. work, and indeed Dr. James and Dr. Pepys had used it in conjunction with B.C.G. in 9 cases. If depot tuberculin were given at the same time as B.C.G. vaccination, the result could be read at the same time as the vaccination was inspected, thereby simplifying procedure. The authors had seen no non-specific oily reactions, and said that the positive result disappeared within three months.

This has not been our experience at Great Ormond Street. Between May and November, 1956, we gave depot P.P.D. to 200 people (142 newborns, 38 older children, and 20 adults) with the following results:

Uncontrolled

P.P.D. in vehicle negative; Mantoux positive (10 units)	40
P.P.D. in vehicle positive; Mantoux negative (10 units)	1
P.P.D. in vehicle positive; no Mantoux test	88

Controlled against Vehicle

P.P.D. in vehicle positive; vehicle negative	23
P.P.D. in vehicle positive; vehicle positive	17

(But P.P.D. reactions larger than control reactions.)

P.P.D. in vehicle negative, vehicle negative; Mantoux positive	7
Equal reaction to P.P.D. in vehicle and to vehicle alone	2
Reaction to vehicle greater than reaction to P.P.D. in vehicle	1
All tests negative	2
Failed to return for reading	19

Thus no fewer than 47 cases out of 200 were negative to P.P.D. in the oily vehicle, although positive Mantoux reactions demonstrated that the patients had developed sensitivity to tuberculin. For this reason alone we would not regard this test as reliable.

Secondly, in several cases there was no difference—or very little difference—between the reaction to P.P.D. and the reaction to the vehicle alone; indeed, in one case the latter was the greater!

Thirdly, after six months some patients still have a dusky red indurated area about half an inch in diameter which shows no signs of disappearing. Although painless, this is æsthetically very unpopular and is probably the greatest disadvantage of depot tuberculin.

I am drawing attention to our results because others may encounter the same difficulties. We do not feel we can recommend this technique at present.

B.C.G. Clinic, Hospital for Sick Children, Great Ormond Street, London, W.C.1. MARCIA HALL.

1. James, D. G., Pepys, J. *Lancet*, 1956, i, 602.

THE FUTURE OF NURSING

SIR,—Dr. Thomas Anderson's latest letter (Feb. 9) spurs against my laziness in not writing before. The majority of student nurses do not possess the intellectual capacity for university training and few receive financial support from their parents after leaving school. They are anxious to engage in practical nursing as soon as possible without lengthy preliminary academic training; for such, the present State training is perfectly adequate and they rapidly realise their prime ambition, which is the emotional satisfaction of nursing the sick patient. There would be a severe drop in the general entry to nursing if a university-trained cadre was available; the simple S.R.N. would feel hopeless of ever attaining high rank in her calling and no longer would a matron's baton be present in any probationer's knapsack. Already an excessive theoretical knowledge is demanded: my lectures in surgery to nurses are up to Conjoint diploma level. No-one can decide a nurse's future quality at the age of 18, and her outlook and possible late mental development may make her a very different person at 21. The advanced course of training should be available after general training has been completed—at the stage of being about to take a ward sister's post when such a course would be of great value.

A nurse will always be subordinate to the doctor because he will always dictate the main line of treatment and take the major responsibility. If a nurse finds her work intellectually unsatisfying then she should (as many have) embark on medicine. At all costs let us avoid the appalling hybrid of nurse cum doctor as envisaged by one of your correspondents of senior nursing rank; though Miss Edwards's wise letter was a reassuring counterbalance.

Wolverhampton. ERIC DOLTON.

SIR,—One month after my 18th birthday I entered the preliminary training school of a large teaching hospital in Cape Town. Six weeks later I was sent to a surgical ward as its most junior nurse and spent by far the greater part of my time making beds, giving out bedpans, keeping the sluiceroom clean, and washing dirty bed-linen. We were also required to do a certain amount of purely domestic work, such as dusting and washing-up.

After two months of this I still felt exhausted every evening (one was almost never off duty dead on time), but as the atmosphere of the ward was cheerful and few of the cases chronic I had no doubts about carrying on. I was then sent on night duty as an extra relief—a job which involved moving round from ward to ward wherever additional help was needed, and one which usually went to the most junior nurse on duty. During my first three weeks of this I nursed the following cases: a two-and-a-half-year-old girl dying of tuberculous meningitis; a young man in the terminal stages of laryngeal carcinoma whom I specialled for three nights until he died; and a case of advanced pemphigus who smelt so appalling that joss-sticks were burnt in the room. Every morning I was required to change and sluice his linen and every morning

I was sick. What made things a great deal worse was that there was virtually nothing I could do to help any of the three.

At the end of the three weeks I went to my family doctor who was the only person with whom I felt I could discuss things, and told him what I had been doing and that I felt I could not carry on. Other girls might be able to cope, but I had had too much. He told me that if I could stick it I should as I would never come across anything worse. I took his advice, found that what he had said was true, and finished my training.

One does not wish to give too gloomy a picture. During those three and a half years I enjoyed myself a great deal, both on and off duty, and made many friends. I never regretted for long my decision to stay. But during that first on the whole very unhappy year I worked under only one ward sister who tried to help me as an individual and who taught me what nursing could be at all levels.

Now I have a very small daughter, and if she should wish to become a nurse I shall try to dissuade her from starting until she is 21—that is unless all the people, matrons, sisters, tutors, and particularly doctors, who are concerned with the training of student nurses, have made a real and sympathetic attempt to understand the special problems they are called upon to face.

Lincoln. CLODAGH WILKINSON.

"REGISTRARS"

SIR,—Since hospital registrars no longer compile the register, could they not revert to the title of assistant—first, chief, senior, junior, medical, surgical, or what you will?

St. Mary's Hospital, London, W.2. A. J. HARROLD.

MULTIPLE PRIMARY GROWTHS

SIR,—For a patient to have three primary growths removed from different organs all in one year must be uncommon.

A woman, aged 62, was admitted to Hackney Hospital on Jan. 19, 1956, with a two-month history suggestive of pyloric stenosis. Barium-meal examination confirmed this, and at laparotomy on Jan. 27 a mobile carcinoma of the pyloric antrum was found with no apparent local or distal spread. In addition there was a mobile carcinoma of the cæcum. Partial gastrectomy was undertaken, but owing to the patient's poor general condition it was decided to remove the cæcal growth later.

Convalescence was protracted, and it was not until March that she was regarded as fit for further operation. On March 9 right hemicolectomy was undertaken and bowel continuity was restored by an end-to-side anastomosis. On this occasion, as previously, no abnormality was found in the pelvis. Convalescence was uneventful, and she was discharged on April 25.

On Aug. 23 she attended the surgical outpatient clinic, complaining of slight loss of blood per vaginam twice during the past three months. On examination there were no abnormal physical signs, but dilatation and curettage on Sept. 14 showed a well-differentiated adenocarcinoma. On Sept. 28 total hysterectomy and bilateral salpingo-oöphorectomy was undertaken. The uterus showed a raised ulcerated area $^1/_2 \times {}^1/_2$ in. on the posterior wall of the fundus with no extension to the peritoneum or myometrium.

The patient's convalescence was uneventful and she was discharged on Oct. 22. When last seen as an outpatient on Nov. 15 she appeared quite well, having no trouble with her bowels and an excellent appetite.

The relevant pathological reports were as follows:

Stomach.—An irregular prepyloric ulcer 9 × 6 cm. with hard edges; microscopically, a moderately well differentiated adenocarcinoma with few mitoses.

Cæcum.—An ulcerating growth 3 × 4 cm. reaching the serosal surface, apparently involving no glands; microscopically, a poorly differentiated adenocarcinoma, not extending to the serosal surface in the portion examined.

Uterus.—A thickened area of endometrium near the fundus 1·5 cm. in diameter; microscopically, a well-differentiated adenocarcinoma.

Hackney Hospital, London, E.9. R. F. READ.

"DOCTOR"

SIR,—Your leading article of Feb. 16 does not do justice to the spirit of the quotation with which it closes. Whether a man "thinketh in his heart" that he is a doctor, or a physician and surgeon, or a medical officer will not, I think, be likely to affect what he *is*. The surgeon who prefers to be called "Mister" may recognise, in his heart, that he can assume no higher title than that of a man.

Enfield, Middlesex. C. M. SMALL.

ACUTE POLYNEURITIS TREATED WITH CORTISONE

SIR,—Following upon the report by Dr. Graveson (Feb. 16) of the successful use of cortisone in acute polyneuritis, it may be of interest to record an example of serum neuritis which quickly resolved following prednisone therapy.

The patient, a man aged 37, injured his thumb and was given an injection of anti-tetanus serum on the next day. Eight days after the inoculation he had an acute systemic reaction, with fever, generalised body pains, and a diffuse erythematous macular rash which lasted twenty-four hours. The generalised body pains cleared in two days but severe pain persisted in the right shoulder, and the musculature of the shoulder-girdle, especially the deltoid, was very weak. The C.S.F. obtained by lumbar puncture showed: cells 17 per c.mm., protein 90 mg. per 100 ml., globulin ++, and Lange 1223330000. Oral prednisone 5 mg. six-hourly was prescribed. Within a day the pain had cleared. Muscular power returned to almost normal in ten days. The dosage of prednisone was tapered off and discontinued after three weeks. A repeat of the C.S.F. examination ten days after the original lumbar puncture revealed: cells 5 per c.mm., protein 50 mg. per 100 ml., globulin –, and Lange 1110000000.

The concept of acute polyneuritis as an allergic manifestation and the general agreement that neurological sequels of serum therapy have a similar basis [1] suggest that steroid therapy, promptly administered, may prevent irreversible damage in serum neuropathy.

Victoria Hospital, Burnley, Lancs. J. SHAFAR.

HEAD INJURIES

SIR,—Mr. T. G. Lowden (Jan. 12), writing about patients with head injuries admitted to peripheral hospitals, asks "what should guide us in deciding whether to send on a case, to ask a neurosurgeon out to see it, or to get on with it ourselves." May I suggest that there is one kind of case which the local surgeon *should* get on with himself. It is the patient who sustains a head injury without impairment of consciousness or with only momentary impairment, who is apparently well for an hour or so, and who then complains of headache *or* vomits *or* becomes drowsy *or* exhibits any neurological sign. Such a sequence must suggest an extradural hæmorrhage and there is no time to transfer the patient or to summon a neurosurgeon. Many fruitless journeys into the country have convinced me that the local surgeon must assume responsibility for such cases. He may be diffident in tackling them for two reasons: (1) he feels that he has not enough neurological experience to be sure of the diagnosis; (2) he is unfamiliar with the operative technique. May I point out that the clinical diagnosis is certain only when the patient is near death. The only way to make certain before that stage is to make an exploratory burr-hole. The rule is: a burr-hole on suspicion, an operation when the suspicion is confirmed. If the surgeon looks on a burr-hole as a purely diagnostic procedure, not as an operation, he will be much more likely to tackle these cases early. The surgical technique necessary for dealing with a middle-meningeal hæmorrhage could be acquired by any general surgeon who takes a week off to loiter in a neurosurgical centre. When

1. *Brit. med. J.* 1956, i, 972.

patients who were unconscious on admission develop signs of compression of the brain, urgency calls for the local surgeon rather than the consultant.

Dublin. A. A. McCONNELL.

DIHYDROCODEINE

SIR,—Respiratory depression has long been considered an unfortunate but inevitable effect of potent narcotics. The recent report by Beecher and his colleagues [1] that dihydrocodeine bitartrate produces full analgesia while sparing the respiratory exchange has therefore aroused considerable interest.

Having recently studied the effects of pethidine on the respiration in anæsthetised patients,[2] I decided to investigate dihydrocodeine under similar conditions. Using the standards of equivalency of Gravenstein et al.[1] and Nathan,[3] dihydrocodeine 0·25 mg. per kg. body-weight has been taken as approximately equivalent to the pethidine 0·6 mg. per kg. body-weight used in the previous (control) study.[2] There is no previous report of the intravenous use of dihydrocodeine, and in view of its pronounced acidity a dilute solution has been employed and the injection made slowly.

First Study

The first investigation was carried out on twenty patients who were about to undergo surgical operation. As in the pethidine series the patients were all in good general condition and were aged 20–50. The preparation of the patient and experimental technique have been reported elsewhere.[4]

Briefly, anæsthesia was induced with 5% sodium thiopentone 8 mg. per kg. body-weight injected intravenously in 45 seconds, and nitrous oxide and oxygen (3 : 1) was then administered throughout the experiment via a closed circuit. Respiratory rate and minute volume (M.V.) were measured 5 minutes after starting the thiopentone injection. At the end of this (control) reading—i.e., at 0+6 minutes—dihydrocodeine in standard dilution (25 mg. per 10 ml.) and standard dosage (0·25 mg. per kg. body-weight) was injected intravenously in 30 seconds. The respiratory rate and M.V. were measured 3, 5, 7, and 9 minutes after the administration of dihydrocodeine.

About 1 minute after the injection of dihydrocodeine four patients began to move either one or both arms and/or legs, sometimes quite forcibly. This movement continued for $^1/_2$–2 minutes after which the patient became settled. This phenomenon never occurred in the pethidine series. In two patients there was localised reddening and wealing at the site of injection. Neither of these effects was noted by Gravenstein et al.[1] No other side-effects were seen.

Table I shows that dihydrocodeine produced, in mild degree, the typical effects of a narcotic analgesic. Comparing its effects with those of pethidine (after checking with the F test of variance that the two groups come from a homogeneous population) the difference between the respiratory rates at corresponding times is significant at $p<0.005$, and the difference between corresponding M.V.s is significant at $p<0.005$ (except at 7 min. $p<0.01$). In five patients there was virtually no depression of M.V.; in three there was a fall of more than twice the group average M.V. depression.

Second Study

This superiority of dihydrocodeine over pethidine in respect of respiratory depression may be intrinsic, but it could be because this dose of the drug is not, in fact, equipotent with pethidine 0·6 mg. per kg. body-weight. Accordingly the experiment was repeated in a further twenty patients using twice the dose of dihydrocodeine; the solution was of twice the concentration. Furthermore it was decided to try the antagonistic effect of levallorphan tartrate in any cases where appreciable respiratory depression occurred.

The "stimulating" effect mentioned above was seen in three cases. Local wealing and reddening occurred in five patients. Linear wealing along part or the whole length of the injected vein was noted in six cases.

Table II gives the respiratory changes in this group of patients. Statistical comparison with the pethidine series shows that the mean fall in respiratory rate is significantly less ($p<0.025$) and the mean M.V. significantly greater ($p<0.05$) in the dihydrocodeine group. In three cases there was virtually no fall in M.V.; in two the M.V. depression was more than twice the group average.

Levallorphan was injected intravenously 10 minutes after the dihydrocodeine and readings of the respiratory rate and volume were taken 1, 3, and 5 minutes later. As in two patients a 1 : 100 ratio of the two drugs proved ineffective, a 1 : 50 ratio was tried. This has been employed in nine cases and has been found consistently to produce an immediate and pronounced increase in M.V. and some increase in rate.

Comment

Investigation of dihydrocodeine under the present conditions will exaggerate the drug's respiratory depressant effect because of an additive effect with thiopentone.[5] However, comparison with the effects of pethidine under identical conditions shows that dihydrocodeine depresses respiration considerably less even in apparently more than equipotent dosage.

The results suggest that further clinical studies of dihydrocodeine's analgesic potency would be worth while. Although this drug does not appear to produce appreciable respiratory depression in clinical dosage it is valuable to have an antidote available, and it seems likely that levallorphan will fill this need. The initial "stimulating" and the histamine-releasing properties of dihydrocodeine will require investigation.

I am grateful to my surgical colleagues and to the theatre staffs of Salford Royal and Hope Hospitals for their coöperation; Mr. Kenneth Spencer and Dr. Randolph White for undertaking the statistical analysis; and Duncan, Flockhart & Co. Ltd. for providing the dihydrocodeine bitartrate.

Salford Royal Hospital, Manchester. MARK SWERDLOW.

1. Gravenstein, J. S., Smith, G. M., Sphire, R. D., Isaacs, J. P., Beecher, H. K. *New Engl. J. Med.* 1956, **254**, 877.
2. Swerdlow, M. *Anæsthesia* (in the press).
3. Nathan, P. W. *Brit. med. J.* 1952, ii, 903.
4. Swerdlow, M. *Brit. J. Anæsth.* 1957, **29**, 21.
5. Swerdlow, M. *Anæsthesia*, 1956, 12, 42.

TABLE I—RESPIRATORY CHANGES AFTER PETHIDINE 0·6 MG. PER KG. AND DIHYDROCODEINE 0·25 MG. PER KG.

Feature	Series	Control	3 min.	5 min.	7 min.	9 min.
Respiratory rate (min.)	Pethidine (S.E. ±)	19·1 (0·8)	10·6 (1·0)	9·9 (1·1)	10·1 (1·0)	9·2 (0·8)
	Dihydrocodeine (S.E. ±)	18·3 (0·7)	15·2 (0·7)	14·4 (0·7)	14·0 (0·7)	13·8 (0·7)
Minute volume (ml.)	Pethidine (S.E. ±)	5361 (400)	3269 (383)	3318 (409)	3648 (414)	3429 (327)
	Dihydrocodeine (S.E. ±)	5529 (311)	5075 (307)	4985 (295)	5081 (282)	4912 (263)
% change in minute alveolar ventilation	Pethidine	..	−32·4	−20·7	−0·57	−2·1
	Dihydrocodeine	..	+0·65	+7·3	+11·0	+7·5

TABLE II—RESPIRATORY CHANGES AFTER DIHYDROCODEINE 0·5 MG. PER KG.

Feature	Control	3 min.	5 min.	7 min.	9 min.
Respiratory rate (min.) (S.E. ±)	18·5 (0·9)	14·6 (1·0)	13·6 (1·0)	13·4 (0·8)	13·0 (0·8)
Minute volume (ml.) (S.E. ±)	5441 (305)	4644 (355)	4470 (286)	4613 (308)	4601 (298)
% change in minute alveolar ventilation	..	−3·8	−3·0	+5·3	+7·2

OLD PEOPLE IN HOSPITAL

SIR,—The articles in your last issue by Dr. DeLargy and by Dr. Rang raise an important question. What principle should guide us in admitting elderly patients to hospital? The waiting-list of most geriatric units contains the names of some who are likely to respond to medical treatment but of many others who are not. Dr. DeLargy's scheme of a six-week stay in hospital is a valiant attempt to meet the needs of the latter. My own survey in Croydon [1] demonstrated that the majority of elderly patients have some social problem complicating their medical condition. Even though they may recover from the illness which precipitated admission to hospital, they may not be able to return whence they came. Yet there are many others anxiously awaiting the use of the bed they occupy.

I have found that in such cases transfer to a "halfway house" is helpful. The frail ambulant can here continue with some treatment and rehabilitation while a solution to their social problems is sought. I am somewhat disturbed, therefore, to read that the average length of stay in the "halfway house" for Dr. Rang's unit is measured in years rather than weeks. My own turnover has been 3 per week (out of a total of 24 beds) for several years past.

My greatest perplexity arises over the mass of incurable patients who tend to silt up the beds in my hospital wards. Some have been transferred from general hospitals to free acute beds there; some have been admitted as social emergencies to prevent further suffering in unsuitable surroundings; and some are simply unlikely to respond to medical treatment. It is these patients, not those in the "halfway house," whose length of stay tends to be measured in years rather than weeks. It is these whose relatives have so far been unwilling to take them home to nurse them there. It is these cases whose mere existence prolongs the waiting-list and delays admissions.

The number of aged sick, increasing year by year, grows faster than the number of staffed hospital beds available for their treatment, care, or custody. Hence Dr. DeLargy's scheme has a great deal to commend it for trial. For, if there is delay in admitting patients with social complications, a state of urgency is likely to arise. Yet, if such cases are given priority, the length of the waiting-list and average duration of stay in hospital increases. Let us hope that the Langthorne procedure will be the via media out of this impasse.

London, S.W.16. TREVOR H. HOWELL.

MUNCHAUSEN'S SYNDROME

SIR,—It may be useful to report another case of Munchausen's syndrome who has been turning up at London hospitals over the past few years.

Usually he simulates meningitis or subarachnoid hæmorrhage, but his repertoire has also included tetanic spasms as well as the usual abdominal components of the syndrome. Our first record of him dates from December, 1953, when he was admitted to Guy's Hospital with abdominal pain and hæmatemesis, but laparotomy showed no abnormality. He has five abdominal scars in all. The following year he was admitted to both Putney Hospital and Guy's Hospital with symptoms suggesting tetanus. In 1955 he apparently attended many hospitals, including Guy's, St. Thomas's, St. Bartholomew's, St. George's, St. Pancras, Poplar General, North Middlesex, and this hospital. He was seen in several psychiatric outpatient departments but never kept his further appointments. His symptoms included abdominal pain, suicidal impulses, and neck stiffness. In December, 1956, he attended Guy's Hospital with neck stiffness, photophobia, and headache; he was admitted but discharged when nothing abnormal was found. A week later he was admitted to the West London Hospital, again with feigned meningitis. He discharged himself on Jan. 16 and the same afternoon was admitted to St. Mary's Hospital complaining of the sudden onset of headache, stiff neck, and photophobia. Lumbar puncture yielded normal cerebrospinal fluid, and after two days he began to have spasms of opisthotonos with flexion of one arm and leg. On being confronted with the evidence of his previous hospital admissions, and with the news that his father was coming to see him, he immediately recovered and was discharged.

It seems highly probable that he will turn up at other hospitals over the next few years, and this information may help to identify him.

St. Mary's Hospital, London, W.2. P. H. SANDERSON.

1. Howell, T. H. *J. Amer. geriat. Soc.* 1956, **4**, 224.

ALLOXAN AS A POSSIBLE THERAPEUTIC AGENT FOR PRIMARY CARCINOMA OF THE LIVER

SIR,—Laboratory observations by others that alloxan-diabetic rats are either totally resistant to the experimental induction of hepatomas by feeding azo-dyes, or can suppress the growth of tumour implants, prompted Professor Gillman and his colleagues (Jan. 12) to administer alloxan to patients with advanced hepatomas in an attempt to induce diabetes and to influence the tumour. Although their results in 4 cases were rather doubtful in regard to the effect of alloxan on the blood-sugar and on the course of the malignant disease, they conclude that the "findings provide some basis for recommending further and more extensive investigation of the significance and interactions of alloxan injections on cancers. . . ."

The authors are apparently unaware that such investigations were carried out more than ten years ago shortly after the discovery of the diabetogenic action of alloxan.[1–3] They were terminated because of rather deleterious results. In a small group of patients with far-advanced carcinoma of various organs with and without liver metastases, alloxan failed to induce diabetes but precipitated severe hepatorenal damage with jaundice and hepatic coma. Also, in insulinomas no satisfactory control of the hypoglycæmia could be obtained but severe liver damage occurred. Histological examinations in these cases demonstrated no significant effect on either the pancreatic beta-cells or the tumour tissue but destruction of renal and hepatic parenchyma. It appeared that in man, unlike most laboratory animals, the hepatotoxic and nephrotoxic dose of alloxan is smaller than the diabetogenic dose.

While Professor Gillman and his colleagues observed no aggravation of the liver disease, they too failed to obtain hyperglycæmia and glycosuria. I would feel negligent if I did not recall these earlier observations and caution against the use of alloxan in man even in conditions which are presently incurable and usually fatal.

Jewish Chronic Disease Hospital, Brooklyn 3, New York. MARTIN G. GOLDNER.

RADIOACTIVE VITAMIN B_{12} IN THE DIAGNOSIS OF NEUROLOGICAL DISORDERS

SIR,—The informed comments of Dr. Booth and Dr. Mollin relating to radioactive vitamin B_{12} (Feb. 16) are most welcome in underlining important theoretical points relating to physiological and pathological aspects of vitamin B_{12} utilisation.

May we re-emphasise the practical clinical importance of the excretion test and in particular of the second part of the test in establishing a diagnosis of subacute combined degeneration of the spinal cord? If with the Schilling excretion test a normal result is obtained after

1. Brunschwig, A., Goldner, M. G., Allen, J. G., Gomori, G. *J. Amer. med. Ass.* 1943, **122**, 966.
2. Brunschwig, A., Allen, J. G., Owens, F. M., Thornton, Th. F. *Ibid.* 1944, **124**, 212.
3. Goldner, M. G., *Proc. Amer. Diabetes Ass.* 1946, **6**, 392.

the administration of vitamin B_{12} by mouth, then the diagnosis cannot be—by definition—subacute combined degeneration. If, however, a low urinary excretion results, the cause of this *may* be subacute combined degeneration. In these circumstances the oral dose of radioactive vitamin B_{12} is repeated, together with 100 mg. of intrinsic factor. If on this occasion the urinary excretion rises to normal levels, the diagnosis is substantiated. If the excretion-rate remains low, even with the addition of intrinsic factor, then the cause lies either in defective absorption from the intestine, as for example in intestinal diverticulosis, or in some defect in the mechanism of excretion, including those renal affections mentioned by Dr. Booth and Dr. Mollin. This point is also stressed by Rath et al.[1] From the practical point of view, it may be pointed out that in cases of renal disease the problem of neurological symptomatology rarely, if ever, arises, and one must point out too that in all these cases clinical history and examination must precede any accessory investigation.

Regarding the estimation of serum-vitamin-B_{12} levels, it should be realised that these will give information only as to the fact of B_{12} depletion, and do not indicate the cause. The real practical value of the excretion test is illustrated by the fact that if (as is possible) a vegan were to develop true subacute combined degeneration, then a low serum-B_{12} level resulting from defective gastric intrinsic factor might be attributed to dietary causes. The vitamin-B_{12} excretion test, of the Schilling type, with and without the administration of oral intrinsic factor, would settle this diagnostic problem quite neatly.

Departments of Neurology and Medicine, University of Manchester and Manchester Royal Infirmary.

L. A. LIVERSEDGE
G. M. BERLYNE.

1. Rath, C. E., McCurdy, P. R., Duffy, B. J. jun. *New Engl. J. Med.* 1957, **256**, 111.

Appointments

AFFLECK, J. W., M.B. Glasg., F.R.F.P.S., D.P.M. : consultant psychiatrist and deputy physician-superintendent, Royal Edinburgh Hospital for Mental and Nervous Disorders.
BALLANTYNE, J. C., F.R.C.S., D.L.O. : consultant otologist, Tewin Water School for the partially deaf, Hertfordshire.
BROOKES, V. S., M.B. Birm., F.R.C.S. : part-time consultant surgeon, Children's Hospital, Birmingham, and part-time consultant surgeon, United Birmingham Hospitals and Dudley and Stourbridge group of hospitals.
CAMPBELL, I. D., M.B. Edin. : deputy senior administrative M.O., South-Eastern Regional Hospital Board, Scotland.
HORNE, J. N., M.D. Camb., M.R.C.P. : M.O., Ministry of Education.
KELLEHER, F. J., M.B. N.U.I., D.P.M. : part-time consultant psychiatrist for Grimsby and district.
MACBEAN, A. F., M.B. Aberd. : regional M.O., Ministry of Health.
MCNEIL, I. H., M.D. Glasg. : regional M.O., Department of Health for Scotland (Glasgow division).
MAY, A. R., M.R. Lond., D.P.M. : chief assistant (S.H.M.O.), psychiatric department, Westminster Hospital, London.
NELSON, A. M., M.B. Edin., D.P.H. : deputy M.O.H. and deputy principal school M.O., Brighton.
PILKINGTON, T. L., M.R.C.S., D.P.M. : senior assistant psychiatrist, to be designated deputy medical superintendent, Glenfrith Hospital, Leicester.
SHIRE, T. H., B.M. Oxfd : clinical assistant, allergy clinics (Wright-Fleming Institute of Microbiology), St. Mary's Hospital, London.

Ministry of Pensions and National Insurance :

BYLES, A. C., M.D. Lond., M.R.C.P. : pneumoconiosis M.O.
CRAN, D. L., M.B. Manc., D.T.M. & H. : pneumoconiosis M.O.
DEMPSEY, A. N., M.B. Belf. : pneumoconicsis M.O.
ELLIS, M. G., D.M. Oxfd : pneumoconiosis M.O.
HAIGH, EDWIN, M.B. Lond., F.R.C.S. : M.O.
HAWKINS, F. S., M.R.C.S. : M.O.
MENZIES, R. D., M.B. Glasg. : M.O.
MORRELL, F. H., M.B. Camb., D.P.H. : pneumoconiosis M.O.
ROBERTS, AUDREY F., M.B. Birm. : pneumoconiosis M.O.
SWANSTON, ALICE C. N., M.R.C.S., D.P.H., D.I.H. : M.O.

East Anglian Regional Board :

COFFEY, V. J., M.B. Calcutta, D.P.M. : assistant radiotherapist, Ipswich and East Suffolk Hospital.
COOK, WENDY A., M.B. Lond., D.OBST. : registrar in obstetrics and gynæcology, Peterborough group of hospitals.
KIRKUP, J. R., M.B. Camb. : orthopædic registrar, Norfolk and Norwich Hospita'.
PROUDMAN, W. D., M.B. Adelaide : surgical registrar, Ipswich and East Suffolk Hospital.

Notes and News

DEVELOPMENTS AT LEICESTER

A NEW building costing about a quarter of a million pounds has been opened at Leicester Royal Infirmary to house large X-ray and casualty departments. It is twenty-five years since the board of governors decided to build it and launched an appeal for funds; but their plans were interrupted by the war and building restrictions.

The X-ray department occupies the first floor, on a site near the main hospital and connected with it by a bridge. It provides for 40,000 examinations a year, and has separate rooms for various special techniques. There is a demonstration room for teaching, and special bays for trolleys.

The ground floor houses the rest of the X-ray department, with theatres for such operations as retrograde pyelography and arteriography. The rest of this floor is devoted to the casualty department, which is designed to cope with 46,000 new patients a year. It includes two 4-bed wards where patients can be observed overnight. There are operating-theatres with recovery rooms, and an X-ray room devoted to casualty work. Every cubicle in the examination and recovery rooms has oxygen and suction pipe-lines. A special section is provided for children; this should be welcomed by the older patients. A basement holds the department of clinical photography, storage space, and a recreation room.

The unloading bay for ambulances is enclosed by a granite wall bearing a relief—the work of a Leicester sculptor—which shows a pair of hands holding a symbolic patient. The interior decoration includes a contemporary colour-scheme in contrasting pastel shades, but a more conservative style in the waiting-rooms, which are so situated that other casualties are not seen by the waiting patients.

APPROVED NAMES FOR DRUGS

THE British Pharmacopœia Commission has issued the following new supplementary list of approved names :

Approved names	*Other names*
Anileridine ..	Ethyl 1-(2-*p*-aminophenylethyl)-4-phenylpiperidine-4-carboxylate
Chlorisondamine Chloride	4 : 5 : 6 : 7-Tetrachloro-2-(2-dimethylaminoethyl) *iso*-indoline dimethochloride Ecolid
Crotamiton ..	Croton-*N*-ethyl-*o*-toluidide Eurax
Dichlorophen ..	Di-(5-chloro-2-hydroxyphenyl) methane Anthiphen
Dioxaphetyl Butyrate	Ethyl 4-morpholino-2 : 2-diphenylbutyrate
Diphemanil Methylsulphate	4-Diphenylmethylene-1 : 1-dimethylpiperidinium methylsulphate Diphenatil
Ethinamate ..	1-Ethynyl*cyclo*hexyl carbamate Valmid ; Valmidate
Fluorocortisone	9α-Fluorohydrocortisone Alflorone ; Florinef
Hexetidine ..	5-Amino-1 : 3-di-(2-ethylhexyl) hexahydro-5-methylpyrimidine Sterisil
Hydroxyzine ..	1-*p*-Chlorobenzhydryl-4-[2-(2-hydroxyethoxy)-ethyl]piperazine Atarax is the hydrochloride
Morpheridine ..	Morpholinoethyl*nor*pethidine
Novobiocin ..	An antibiotic produced by *Streptomyces niveus* and *Streptomyces spheroides* Streptonivicin Albamycin is the calcium salt ; Biotexin is the sodium salt ; Cathomycin is the sodium salt
Oleandomycin ..	An antibiotic produced by certain strains of *Streptomyces antibioticus* Matromycin ; Romicil
Ostreogrycin ..	An antibiotic produced by *Streptomyces ostreogriseus* Ostreocin
Oxeladin ..	Diethylaminoethoxyethyl α : α-diethylphenylacetate Perclamol is the citrate
Paracetamol ..	*p*-Acetamidophenol Panadol
Phenobutiodil ..	α-(2 : 4 : 6-Tri-iodophenoxy)butyric acid Biliodyl
Phenomorphan.	3-Hydroxy-*N*-(2-phenylethyl)morphinan
Propoxyphene ..	4-Dimethylamino-1 : 2-diphenyl-3-methyl-2-propionyl oxybutane
Thenalidine ..	1-Methyl-4-*N*-(2-thenyl)anilinopiperidine Sandosten is the tartrate
Thyrotrophin ..	Thyrotrophic hormone Thytrophin
Vancomycin ..	An antibiotic produced by *Streptomyces orientalis* Vancocin
Warfarin ..	3-(2-Acetyl-1-phenylethyl)-4-hydroxycoumarin Coumadin

RESOLUTIONS BY JUNIOR HOSPITAL STAFF

ON Feb. 11 at a meeting of the junior medical staff of the Edgware General Hospital, the following resolutions were passed unanimously:

We shall support to our utmost every effort to secure the 24% increase in remuneration being sought by the Negotiating Committee. At the same time, we wish to draw especial attention to the urgent needs of full-time junior hospital staff, whose salaries are entirely inadequate, and who need more than a 24% increase on their present salaries to bring them to a reasonable standard of remuneration.

Further, it is agreed that the present claim and past increase in salary in no way detract from our belief that the Spens report concerning the remuneration of hospital staff must finally be implemented, as this has not hitherto been done.

It is also resolved that a mere increase in salary is not sufficient and that prospects of promotion must also be improved. At present the prospects of promotion for those wishing to specialise are virtually non-existent, and to this end a complete revision of the staffing of hospitals is urgently required.

CHILDREN'S INSTITUTIONS

TODAY it is widely accepted that an institution is one of the less satisfactory places in which to bring up a child. But unfortunately there will always be some children who, usually for unhappy reasons, must spend a shorter or longer part of their childhood in an institution. It is therefore important that the place should not be as forbidding as the name and that the care it offers should be the best that can be arranged. A report to the Social Commission of the United Nations[1] reviews institutions and new work in countries all over the world. A global survey of only 70 pages must be selective, but this one makes clear that, though the diversity of their practice sensibly reflects local customs and conditions, the nations share a common concern for these vulnerable children.

MALARIA CONTROL

LAST November delegates from many countries in Africa and islands in the Indian Ocean met in Nairobi under the auspices of the World Health Organisation, to discuss malaria control. South Africa, Mauritius, and the higher parts of Southern Rhodesia and Madagascar are now (it was reported) virtually free of the disease: the control campaigns will be continued till malaria has become a curiosity—which is already true in Mauritius. In West Africa success is described by Dr. M. T. Gillies as only occasionally great enough to justify the large sums of money spent on it; "The fact that it is only partially successful," he says, "means that the spraying must be continued indefinitely. It is here that the danger lies. In Northern Nigeria a trial project was carried out using one of the newer insecticides. The results were so encouraging the first year that plans were made for a very large scale extension of the scheme, so as to protect eventually up to two and a half million people. But during the second year the mosquitoes began to come back again into the houses, and it was soon discovered that they had become resistant to the insecticide and were no longer being killed by it. When I was there in July 1956 the position was so bad, and the mosquitoes so numerous, that in the evenings the toads would gather about the verandah floor and pick off the *Anopheles* from our shoes and ankles as they settled there to bite. In fact it was perfectly clear that control with this insecticide had completely broken down, and the whole campaign had to be switched to another insecticide which remains, for the moment, moderately successful. This unhappy experience has up till now only been repeated in one other area, also in Northern Nigeria. But its occurrence is the writing on the wall. It is now realised that, in regions where resistance is likely to occur, we have only a few years in which to eliminate malaria before the weapons become blunted in our hands. We do not know at present how widespread the tendency to develop resistance is, but it is encouraging that it has not appeared in South Africa despite the use of insecticides for up to ten years."

Air-conditioning for Bronchitis

A scheme is being prepared for air-conditioning two wards at the Liverpool Chest Hospital so that the effect of nursing chronic bronchitics in such accommodation during severe winter weather and fog can be studied.

1. Institutional Care of Children (United Nations: Department of Economic and Social Affairs. 1956. Obtainable from H.M. Stationery Office. Pp. 70. 3s. 6d.).

University of Leeds

Dr. G. H. Lathe has been appointed professor and head of the department of chemical pathology.

Dr. Lathe, who is 43 years of age, graduated B.SC. in 1934 from McGill University, Montreal, and M.D. four years later. After holding research appointments in the department of physiology he served from 1941 to 1945 as a regimental medical officer and later as a biochemist in the Royal Canadian Army Medical Corps. In 1946 he came to England and held an I.C.I. research fellowship at the University of Oxford and at the Postgraduate Medical School of London. In 1947 he was awarded the degree of PH.D. of McGill University. Since 1949 he has held the post of biochemist in the Bernhard Baron Chemical Research Laboratories of Queen Charlotte's Maternity Hospital, London, and he is a member of the academic board of the Institute of Obstetrics and Gynecology. He has published articles on absorption from the alimentary tract, the physiological and metabolic consequences of wounds, and the biochemistry of the bile pigments and their production in the liver.

Dr. J. M. Roberts has been appointed lecturer in the department of psychiatry.

University of Otago

Dr. J. R. Robinson, assistant director of research in the department of experimental medicine of the University of Cambridge, has been appointed associate professor of physiology in the university.

Dr. Robinson, who is 42, was educated at Ulverston Grammar School and Emmanuel College, Cambridge. He took a double first in the natural sciences tripos and after graduating spent some years, while holding the research scholarship of his college, in the departments of biochemistry and colloid science studying the shapes of protein particles in solution. In 1938 he took the degree of PH.D. and in 1940 he went to the London Hospital Medical College with an open entrance scholarship. After qualifying in 1943 he held house-appointments at the London, and in 1944 he joined the R.A.M.C. and served in India, where he was in charge of the biochemical department of the central military pathological laboratory at Poona. In 1947, after he returned to civilian life, he was appointed college lecturer and director of studies in medicine at Emmanuel College and was elected to a supernumerary fellowship. He was appointed to his present post in the department of experimental medicine in 1949, and since 1951 he has also been secretary to the faculty board of medicine. He received the degree of M.D. in 1952. He spent 1954–55 in New Zealand as a senior visiting lecturer in the department of physiology of the University of Otago. His published work includes papers on electrolytes and renal function.

University College of the West Indies

Dr. R. J. Gourlay, assistant senior medical officer of the North West Metropolitan Regional Hospital Board, has been appointed senior lecturer in preventive medicine.

Harveian Society of London

Sir Russell Brain, F.R.C.P., will deliver the Harveian lecture to this society on Wednesday, March 27, at 8.15 P.M., at 11, Chandos Street, London, W.1. He is to speak on disorders of the cerebral circulation.

British Diabetic Association

The Banting memorial meeting of this association will be held in Oxford on July 12 and 13. The speakers will include Prof. H. A. Krebs, F.R.S., and Prof. C. H. Best, F.R.S. Further particulars may be had from the association, 152, Harley Street, London, W.1.

Association of Surgeons of Great Britain and Ireland

The annual general meeting of this association will be held at Newcastle upon Tyne from April 25 to 27. Prof. Alexander Haddow will give the Rutherford Morison lecture, on the present trends of cancer research; and the programme will also include discussions on prevention of sepsis in operating-theatres (opening speakers Mr. D. R. Davies, Dr. R. Blowers, and Dr. R. A. Shooter), minor complaints of the rectum and anus (Mr. T. McW. Millar, Mr. A. G. Parks, Mr. H. T. Simmons, and Mr. H. R. Thompson), early treatment of burns (Mr. A. B. Wallace), and thyrotoxicosis (Dr. W. R. Trotter and Mr. K. Paterson-Brown).

A Comprehensive Nursing Course

In September an experimental course is to be started by the Postgraduate Medical School of London, the Battersea College of Technology, and the Queen's Institute of District Nursing which will enable a student in 4 years, instead of the present 5 years or more, to qualify as a State-registered nurse, a health visitor, and a Queen's district nurse. She will be able to take a part-I Central Midwives Board certificate, so that with only 6 months' further training she can also become a fully qualified S.C.M. Previously the course for each of these examinations has had to be taken separately.

Newcastle Flying Squad

The 21st birthday of the Newcastle Obstetric Emergency Service, whose work was described in an annotation last week, was celebrated on Feb. 21 when a party was given at the Princess Mary Maternity Hospital by the board of governors of the United Newcastle upon Tyne Hospitals. Viscountess Ridley, chairman of the committee of management of the Princess Mary Maternity Hospital, presented a portrait to Prof. E. Farquhar Murray, who was largely responsible for the inauguration of the service.

Nutrition Society

This society is holding a symposium at 1, Wimpole Street, London, W.1, on Saturday, March 23, on Man's Need for Water. Prof. R. A. McCance, F.R.S., will be in the chair and the speakers will include Mr. H. W. Cremer, F.R.I.C., Dr. J. R. Robinson, Dr. J. Russell Elkinton, Miss E. M. Widdowson, D.SC., Dr. D. A. K. Black, and Dr. W. F. Young. Further particulars may be had from the hon. programmes secretary of the society, Dr. R. J. L. Allen, c/o Beecham Foods Ltd., Brentford, Middlesex.

Scottish Group.—This group is holding a symposium in Aberdeen on Saturday, April 20, on clean food. Further particulars may be had from Dr. J. Davidson, Rowett Research Institute, Bucksburn, Aberdeenshire.

Revised Fees for Dentists

Changes in the fees payable to dentists for treatment under the National Health Service will come into force on April 1. The revised scale, which has been drawn up in consultation with the British Dental Association, is not designed to give an increase in the total remuneration of dentists but rather to achieve a better balance.

More money is being devoted to the treatment of children's teeth, and, in place of the present flat fee applying to any conservative treatment to a deciduous tooth, varying amounts will be payable for different kinds of fillings, for vital pulpotomy, and for conservation by other means. The removal of calculus, the removal of stain, and polishing of the teeth also attract separate fees. These changes will, it is hoped, offer further encouragement to the treatment of young people.

Crash Helmets

On and after April 1 it will be an offence to sell, or offer for sale, a protective helmet for motor-cyclists unless it is of a type authorised by Ministry of Transport regulations.

Lipids and the Problem of Atherosclerosis

Prof. R. A. Morton, F.R.S., will give an address on this subject to the Oils and Fats Group of the Society of Chemical Industry on Wednesday, March 13, at 7 P.M., at the department of organic chemistry of the University of Liverpool.

The Child and his Home

The British Social Biology Council is holding a summer school on this theme, for teachers, social workers, health visitors, and others, at Aix-en-Provence from Aug. 24 to Sept. 8. Further information can be had from the council, Tavistock House South, Tavistock Square, London, W.C.1.

Glasgow's Tuberculosis Campaign

To mark the opening of this campaign, Sir Geoffrey Todd is to give a lecture at the Institution of Engineers and Ship Builders, 39, Elmbank Crescent, Glasgow, C.2, on Wednesday, March 13, at 4 P.M. He is to speak on the prognosis of pulmonary tuberculosis in the light of modern treatment, with special reference to Midhurst Sanatorium.

Ocular Manifestations in Clinical Neurology

Mr. Joseph Minton will give six lecture-demonstrations on this subject at the West End Hospital for Neurology and Neurosurgery, 91, Dean Street, London, W.1, on Tuesdays at 4 P.M., beginning on April 9. Further particulars may be had from the secretary of the postgraduate medical school of the hospital.

Dr. Frank Falkner has been awarded a scholarship in medicine of the John and Mary Markle Foundation.

The Tanner prize of the Royal Institute of Public Health and Hygiene for 1956 has been awarded to Dr. Sheila Robinson.

Diary of the Week

MARCH 3 TO 9

Sunday, 3rd

UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL, University Street, W.C.1
10.15 A.M. Dr. G. I. M. Swyer: Use of Hormones in General Practice. (Clinical demonstration for general practitioners.)

Monday, 4th

UNIVERSITY COLLEGE LONDON, Gower Street, W.C.1
5 P.M. Dr. George Popjak: Biochemistry of Fatty Acids and Cholesterol. (First of three lectures.)

MARLBOROUGH DAY HOSPITAL, 38, Marlborough Place, N.W.8
8.15 P.M. Mr. M. M. Simmons, Dr. D. Russell Davis: The Intelligent Offender—His Treatment in an Approved School.

Tuesday, 5th

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
3.45 P.M. Dr. A. J. M. Reese: Atheroma. (Erasmus Wilson demonstration.)

ST. MARY'S HOSPITAL MEDICAL SCHOOL, Paddington, W.2
5 P.M. Mr. R. M. Feroze: Dysfunctional Uterine Haemorrhage.

INSTITUTE OF DERMATOLOGY, Lisle Street, W.C.2
5.30 P.M. Mr. B. E. D. Cooke: Disorder of Buccal Mucosa.

WEST END HOSPITAL FOR NEUROLOGY AND NEUROSURGERY, 91, Dean Street, W.1
5.30 P.M. Mr. G. C. Knight: Diagnosis of Cerebral Tumours.

MANCHESTER MEDICAL SOCIETY
4.30 P.M. (Medical School, University of Manchester.) *History of Medicine.* Dr. Peter Bishop: Life and Work of Thomas Addison.

Wednesday, 6th

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5.15 P.M. *History of Medicine.* Prof. F. G. Young, F.R.S.: Glycogen 1857–1957. Dr. Gordon Mestler: Old Japanese Medicine.
8 P.M. *Surgery.* Mr. Hedley Atkins, Mr. Murray Falconer, Prof. C. F. W. Illingworth, Mr. E. J. Radley Smith, Mr. W. P. Greening: Hypophysectomy for Cancer.

POSTGRADUATE MEDICAL SCHOOL OF LONDON, Ducane Road, W.12
2 P.M. Dr. Reginald Hudson: The Heart Septa.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. R. W. Riddell: Problems of Therapy in Fungus Diseases.

INSTITUTE OF DISEASES OF THE CHEST, Brompton, London, S.W.3
5 P.M. Dr. B. G. B. Lucas: Man and His Ventilation.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Dr. B. C. G. Ackner: Emotional Aspects of Bodily Complaints.

UNIVERSITY OF OXFORD
5 P.M. (Radcliffe Infirmary.) Dr. Paul Wood: Pulmonary Hypertension.

MIDLAND MEDICAL SOCIETY
8.15 P.M. (Birmingham Medical Institute, 154, Great Charles Street, Birmingham, 3.) Dr. C. G. Parsons: The General Practitioner and the Chesty Child.

MANCHESTER MEDICAL SOCIETY
4.30 P.M. (Medical School, University of Manchester.) Joint meeting with the Liverpool Medical Institution. Dr. R. R. Hughes: Changes in E.E.G. Produced by Biochemical and Endocrine Abnormalities. Dr. J. D. Hay, Mr. F. R. Edwards: Diagnosis and Surgical Treatment of Pulmonary Stenosis.

NOTTINGHAM MEDICO-CHIRURGICAL SOCIETY, 64, St. James's Street
8.30 P.M. Dr. D. I. McCallum: Eyelid Œdema in Dermatology. Dr. J. M. Macfie: Examination of the Hands. Mr. H. H. Renyard: The Umbilicus.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW, 242, St. Vincent Street, Glasgow, C.2
5 P.M. Mr. D. W. Currie: Results of Twenty-one Years of Surgical Treatment of Cancer of the Cervix. (Finlayson lecture.)

Thursday, 7th

ROYAL SOCIETY OF MEDICINE
5 P.M. *United Services.* Surgeon Commander J. M. Cliff, Dr. N. M. Lloyd Rusby: Spontaneous Pneumothorax.

ST. JOHN'S HOSPITAL DERMATOLOGICAL SOCIETY, Lisle Street, London, W.C.2
5 P.M. Dr. G. B. Mitchell-Heggs, Dr. A. Whitlock, Dr. Desmond O'Neill: Psychiatry as an Aid to Dermatology.

MIDLAND THORACIC SOCIETY
7.30 P.M. (Queen Elizabeth Hospital, Edgbaston, Birmingham, 15.) Dr. W. Jones: Pneumoconiosis.

LIVERPOOL MEDICAL INSTITUTION
5.15 P.M. (Medical School, University of Liverpool.) *History of Medicine.* Mr. J. B. Oldham: Two Centuries Ago.

UNIVERSITY OF ST. ANDREWS, Queen's College, Small's Wynd, Dundee
5 P.M. Dr. J. McG. Rogan: Coalminers' Pneumoconiosis.

Friday, 8th

POSTGRADUATE MEDICAL SCHOOL OF LONDON
10 A.M. Mr. S. H. Wass: Surgery in the Treatment of Ulcerative Colitis.
4 P.M. Dr. Denis Williams: Focal Fits.

INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
3.30 P.M. Mr. Anthony Radcliffe: Nasal Catarrh.

INSTITUTE OF DISEASES OF THE CHEST
5 P.M. Air Commodore C. A. Rumball: Cardio-respiratory Assessment.

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The Terms and Conditions of Service of Hospital Medical and Dental Staff apply to all N.H.S. hospital posts we advertise, unless otherwise stated. Canvassing disqualifies, but candidates may normally visit the hospital by appointment.

Academic and Educational

ROYAL COLLEGE OF PHYSICIANS OF LONDON

JOHN RUPERT SQUIRE, Esq., M.D., F.R.C.P., will deliver the OLIVER-SHARPEY LECTURES on TUESDAY, 12TH and THURSDAY, 14TH MARCH, 1957, at 5 P.M., at the College, Pall Mall East, S.W.1.

Subject: "The Functions of the Plasma Proteins."

Any member of the medical profession admitted on presentation of card.

By order of the President.
HAROLD BOLDERO, Registrar.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

ELECTION OF PROFESSORS AND LECTURERS

The Council invites applications for election to the office of Hunterian Professor, Arris and Gale Lecturer, Arnott Demonstrator and Erasmus Wilson Demonstrator for the ensuing year.

The 12 Hunterian Lectures, illustrated by Hunterian specimens, are delivered by Fellows or Members of the College. The 3 Arris and Gale Lectures are on subjects relating to Human Anatomy and Physiology, the 6 Arnott Demonstrations on the contents of the Museum, and the 5 Erasmus Wilson Demonstrations on the Pathological contents of the Museum.

Applications in writing must be made to the Secretary on or before Saturday, 27th April. Candidates for the Hunterian Professorships, Arris and Gale Lectureships are requested to submit with their applications 25 copies of a synopsis of approximately 500 words describing the subject matter of their proposed lecture. Each copy of the synopsis to have the name of applicant in the top right-hand corner. Applicants are required to state their present appointments and the extent to which the work submitted is original. Work carried out under a superior must be shown to have the latter's approval before being submitted.

In the case of Hunterian Lectures the Council is prepared to consider applications for either a series of lectures or a single lecture.

KENNEDY CASSELS, Secretary.

Lincoln's Inn-fields, London, W.C.2, 2nd March, 1957.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

The Council invite applications for the following Annual Examinerships :—

FOR THE FELLOWSHIP	No. to be elected	No. who seek re-election
*Anatomy :—		
Surgeons	4	4
Anatomists	4	4
*Pathology	4	4
*Applied Physiology	4	4
*Associate Examiner in Ophthalmology	1	1
FOR THE LICENCE IN DENTAL SURGERY		
Board of Examiners in Dental Surgery (Surgical Section) (Examiners must be Fellows of the College, and will be required to examine in General Surgery (including Surgical Pathology), Medicine, General Pathology, and Bacteriology)	6	5
FOR THE FELLOWSHIP IN DENTAL SURGERY		
Board of Examiners for the Fellowship in Dental Surgery (Examiners must be Fellows of the College, and will be required to examine in General Surgery)	2	2
FOR THE FELLOWSHIP OF THE FACULTY OF ANÆSTHETISTS		
The Examiner must be a Surgeon and will be required to conduct (with a Physician) Part II (Medicine and Surgery) of the Final Examination	1	0
UNDER THE EXAMINING BOARD IN ENGLAND		
Elementary Biology	2	2
*Anatomy	3	2
*Physiology	2	1
†Midwifery	4	4
Pathology (for M.R.C.S., L.R.C.P.) :—		
Surgeons	2	2
Pathologists	2	2
Public Health	1	0
Tropical Medicine and Hygiene :—		
Pathology and Tropical Hygiene	1	1
Tropical Medicine and Surgery	1	0
Ophthalmology	7	6
Psychological Medicine :—		
Part I (Neurologist)	2	2
Laryngology and Otology :—		
Part I	2	2
Part II	1	0
Medical Radio-Diagnosis :—		
Part I	1	1
Part II	1	1
Medical Radiotherapy :—		
Part I	1	1
Part II	1	1
Anæsthetics :—		
Surgeon	1	0
Anæsthetist	1	1
Child Health	3	2
Physical Medicine :—		
Part I	2	2
Part II	2	2
Industrial Health	1	1
Pathology (for Diploma in Pathology)	2	1

*Candidates must hold a medical qualification registrable in this country.

†Candidates must be Fellows or Members of the College.

Forms of application can be obtained from the Secretary, and these must be completed and returned by Saturday, 23rd March, 1957.

KENNEDY CASSELS, Secretary.

Lincoln's Inn-fields, W.C.2, 2nd March, 1957.

UNIVERSITY OF GLASGOW and ROYAL FACULTY OF PHYSICIANS AND SURGEONS

POSTGRADUATE MEDICAL EDUCATION COMMITTEE

COURSE ON UROLOGY

A COURSE OF INSTRUCTION IN UROLOGY will be held in the Royal Faculty of Physicians and Surgeons, 242, St. Vincent-street, Glasgow, and in the teaching hospitals of Glasgow from 1ST APRIL to 5TH APRIL, 1957.

Monday, 1st April, 1957

2.00 P.M. Inauguration.

2.15 P.M. Clinico-pathological Conference on Urological Diseases
Chair : W. B. DAVIS.

Tuesday, 2nd April, 1957
At Victoria Infirmary, Langside, Glasgow, S.2

9.30 A.M. Operating Session and Clinical Demonstration : T. L. CHAPMAN and Staff.

12.30 P.M. Lunch at Victoria Infirmary.

2.00 P.M. Short Papers :
J. E. CRAIK : Renal Function Tests.
J. W. SUTHERLAND : Studies in Calculus Disease.

Wednesday, 3rd April, 1957
At Royal Infirmary, Castle-street, Glasgow, C.4

9.30 A.M. Operating Session and Clinical Demonstration : A. JACOBS and Staff.

12.30 P.M. Lunch at Glasgow Royal Infirmary.
At Faculty Hall, 242, St. Vincent-street, Glasgow, C.2

2.00 P.M. "Bladder Tumours" : DR. CUTHBERT DUKES, London.

3.00 P.M. Discussion
Openers : A. JACOBS ; T. SYMINGTON ; T. L. CHAPMAN ; W. S. MACK.

Thursday, 4th April, 1957
At Western Infirmary, Dumbarton-road, Glasgow, W.1

9.30 A.M. Operating Session and Clinical Demonstration : W. S. MACK and Staff.

12.30 P.M. Lunch at Western Infirmary.

2.00 P.M. Short Papers :
W. L. MILNE : Polycystic Disease.
L. S. SCOTT : Renal Tumours in Childhood.

Friday, 5th April, 1957
At Royal Infirmary, Castle-street, Glasgow, C.4

9.30 A.M. Symposium on Genito-Urinary Tuberculosis : W. M. BORTHWICK ; W. G. WIMSETT ; A. JACOBS.

11.15 A.M. Short Papers :
W. B. STIRLING : Renal Angiography :
A. MARSHALL : Urinary Infection in the Catheterised Patient.

12.30 P.M. Lunch at Glasgow Royal Infirmary.
At Faculty Hall, 242, St. Vincent-street, Glasgow, C.2

2.30 P.M. Symposium on Dilatation of the Upper Urinary Tract :
W. S. MACK : Dilatation of the renal pelvis and ureter.
A. JACOBS : The correction of obstruction at the pelvi-ureteral junction.
T. L. CHAPMAN : The aberrent artery in relation to hydronephrosis.
R. A. TENNENT : Dilatation of the upper urinary tract in pregnancy.

There is no fee for the Course.

Further particulars may be obtained from the Registrar, Royal Faculty of Physicians and Surgeons, 242, St. Vincent-street, Glasgow, C.2.

FACULTY OF ANÆSTHETISTS

ROYAL COLLEGE OF SURGEONS OF ENGLAND

A COURSE of 24 LECTURES IN ANÆSTHETICS will be given at the College from 1ST to 12TH APRIL, 1957. The entrance fee is 24 guineas.

For further information write to W. F. DAVIS, Esq., Secretary, Faculty of Anæsthetists, Royal College of Surgeons of England, Lincoln's Inn-fields, London, W.C.2.

THE ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE

THE DIPLOMA IN PUBLIC HEALTH
THE DIPLOMA IN INDUSTRIAL HEALTH

The next COURSES OF INSTRUCTION for the above Diplomas will commence on 15TH MARCH, 1957. Tuition may be taken whole-time or part-time.

Prospectuses, enrolment forms and full details may be obtained from the Secretary, 28, Portland-place, London, W.1 (telephone: LANgham 2731/2).

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE

SCHOLARSHIPS FOR THE 1957–58 DIPLOMA IN PUBLIC HEALTH COURSE

Applications are invited from registered medical practitioners for (*a*) the A. H. BYGOTT SCHOLARSHIP, value £200 ; (*b*) 2 ELLISTON MEMORIAL SCHOLARSHIPS, each value £150 ; and (*c*) the SIR ARTHUR NEWSHOLME MEMORIAL SCHOLARSHIP, value approximately £200. No tuition fees are charged to successful candidates. Applicants may apply for more than 1 Scholarship.

These Scholarships are tenable for 1 session at the London School of Hygiene and Tropical Medicine for the course for the University of London's Academic Postgraduate Diploma in Public Health commencing 1st October, 1957.

Applications must be received by 15th May, 1957, by the Dean, London School of Hygiene and Tropical Medicine, Keppel-street (Gower-street), London, W.C.1, from whom application forms may be obtained.

THE BERKELEY FELLOWSHIP

(Founded in memory of the late Sir G. H. A. COMYNS BERKELEY and his wife, ETHEL ROSE BERKELEY)

The Berkeley Fellowship was founded under the will of the late Sir G. H. A. Comyns Berkeley to provide an opportunity for research in medicine, or for visits to medical institutions or hospitals to a person elected jointly by the Master and Fellows of Gonville and Caius College, Cambridge, and the Council of The Middlesex Hospital Medical School. Under the terms of the bequest, medical centres in any part of the world may be visited, with the exception of Oxford or Cambridge.

Applications from graduates in medicine of The Middlesex Hospital Medical School are invited for the Fellowship. The period of tenure of the Fellowship and the emoluments will depend upon the circumstances of each case. A Fellowship will not normally be awarded for a period shorter than 3 months or longer than 1 year, but applications for renewal will be considered. The emolument may be paid as stipend or as grant to cover travel and other expenses necessarily incurred by the Fellow in the performance of his programme of work, or partly as stipend and partly as grant. The total emolument allowed will not normally exceed £1500 during 1 years tenure.

Applications should reach the Dean of The Middlesex Hospital Medical School by 30th April, 1957, and should include the following information :—

(*a*) Name, address and age.
(*b*) Qualifications and experience.
(*c*) Present appointment.
(*d*) Programme of work proposed, with estimate of necessary expenses.
(*e*) Other sources of financial assistance, including any stipend from present appointment, if continued during the tenure of the Fellowship.

FACULTY OF DENTAL SURGERY

ROYAL COLLEGE OF SURGEONS OF ENGLAND

EXAMINERSHIPS

The Board invite applications for the following Examinerships for submission to the Council of the College :—

FOR THE LICENCE IN DENTAL SURGERY

FIRST EXAMINATION, PART I

	Number to be elected
Anatomy	2
Physiology	2
FIRST EXAMINATION, PART II	
Special Anatomy and Physiology	4
SECOND EXAMINATION	
Dental Prosthetics and Properties of Dental Materials	5
* FINAL EXAMINATION	
Dental Section	4
FOR THE FELLOWSHIP IN DENTAL SURGERY	
PRIMARY EXAMINATION	
Anatomy	2
Physiology	2
Pathology	2
* Dental Section	2
FINAL EXAMINATION	
* Dental Section	4
FOR THE DIPLOMA IN ORTHODONTICS	
* Dental Surgery	6
Anatomy	1
Physiology	1

* Candidates must be registered under the Dentists Act, 1878–1923.

Application forms may be obtained from the Secretary of the Faculty, Royal College of Surgeons of England, Lincoln's Inn-fields, London, W.C.2, and must be returned to him by Saturday, 23rd March, 1957.

W. F. DAVIS, Secretary, Faculty of Dental Surgery.

THE UNIVERSITY OF SHEFFIELD. Applications are invited from medically qualified persons for the following posts:—

(*a*) LECTURER IN ANATOMY.
(*b*) DEMONSTRATOR IN ANATOMY (1 or 2).

to begin duties on 1st October, 1957. Salary scales : Lecturer —£1000–£100–£1700 ; Demonstrator—£700–£100–£900, with F.S.S.U. provision and family allowance. Initial salary on either scale according to qualifications and experience. The laboratories are well equipped for histological, histochemical and experimental research.

Further particulars should be obtained from the Registrar, to whom applications (4 copies) should be sent by 13th April, 1957.

THE UNIVERSITY OF LEEDS. Department of Chemical PATHOLOGY. Applications are invited from honours graduates in chemistry or biochemistry and from medically qualified persons for appointment as DEMONSTRATOR or LECTURER IN CHEMICAL PATHOLOGY. Salary for a Demonstrator will be on the scale £700–£100–£900 if medically qualified or within the range £550–£650 if not medically qualified ; for a Lecturer the salary will be on the scale £1100–£100–£1700 if medically qualified or £650–£50–£1350 if not medically qualified.

Applications (3 copies), stating date of birth, qualifications, and experience, together with the names of 3 referees, should reach the Registrar, The University, Leeds, 2 (from whom further particulars may be obtained), not later than 25th March, 1957.

THE UNIVERSITY OF LEEDS. UNITED LEEDS HOSPITALS. Applications are invited for appointment as SENIOR REGISTRAR AND TUTOR IN DERMATOLOGY at a salary on the scale £1100–£100–£1400 a year.

Applications (3 copies), stating date of birth, qualifications, details of present and previous appointments with dates, and experience of teaching, together with the names of 3 referees, should reach the Registrar, The University, Leeds, 2 (from whom further particulars may be obtained), not later than 25th March, 1957.

THE UNIVERSITY OF LIVERPOOL. Applications are invited for the post of LECTURER in the Department of Biochemistry, at an initial salary within the range £1000–£1200 p.a. for a medically qualified candidate and within the range £650–£1050 p.a. for a non-medically qualified candidate, according to qualifications and experience.

Applications, stating age, academic qualifications, and experience, together with the names of 3 referees, should be received not later than 23rd March, 1957, by the undersigned, from whom further particulars of the conditions of appointment may be obtained. STANLEY DUMBELL, Registrar.

NUFFIELD ORTHOPÆDIC CENTRE, Headington, OXFORD. The Trustees invite application from suitably qualified persons for the following Scholarships :—

THE LORD NUFFIELD SCHOLARSHIP IN ORTHOPÆDIC SURGERY.

Value £800 p.a. tax free, plus £160 p.a. living-out allowance and the possibility of a terminal grant for the study of orthopædics elsewhere.

GIRDLESTONE MEMORIAL SCHOLARSHIP.

Value £330 p.a. tax free, plus a living-out allowance of £160.

Applications, giving full personal details together with the names of 2 referees, should be received not later than 31st March, 1957, by the undersigned from whom full particulars can be obtained. JOHN MULLINS, Secretary to the Trustees.

UNIVERSITY OF SASKATCHEWAN. Department of ANÆSTHESIA, UNIVERSITY HOSPITAL. Applications are invited from qualified medical practitioners for the post of CLINICAL AND RESEARCH FELLOW (non-resident). Duties will include administration of anæsthetics and assisting the Staff with teaching of students and house staff, as well as with research projects. The Department is fully approved by all examining specialty bodies in Canada, the U.K. and the United States. Completion of training is a prerequisite and preference will be given to holders of the F.F.A.R.C.S. or equivalent qualifications such as American Boards. Appointment is to start on 1st July, 1957, and will be tenable for 1 year. Remuneration Canadian $5000 p.a.

Applications, including recent photograph, curriculum vitæ and 3 references, should be addressed to—

GORDON M. WYANT, F.F.A.R.C.S., Professor of Anæsthesia. University of Saskatchewan, Saskatoon, Canada.

OHIO STATE UNIVERSITY. Large mid-western university in United States of America offers opportunities for approved training in Pathology and Clinical Pathology and also advanced work in teaching and research as INSTRUCTOR or ASSISTANT PROFESSOR. Salaries range from $2100 to $6000 per year depending upon qualifications.

For further information contact Dr. EMMERICH VON HAAM, Department of Pathology, Ohio State University, Columbus 10, Ohio, U.S.A.

Hospital Services : Senior Appointments

KING'S COLLEGE HOSPITAL, Denmark-hill, London, S.E.5. Applications are invited for a Part-time CONSULTANT in Surgery for 5 sessions per week, the post to be combined with that of Surgical Tutor to the Medical School. The successful applicant will devote in addition the equivalent of 3 sessions to his Medical School duties, for which the salary will be £750 p.a. The post is tenable from 7th May, 1957.

Applications (12 copies), giving details of age, qualifications and experience, and with the names of 3 referees, should be sent to the undersigned not later than 30th March, 1957.

S. W. BARNES, House Governor.

MIDDLESEX HOSPITAL, W.1. Applications invited for post of ASSISTANT in Outpatient Department of Psychological Medicine, 2 sessions weekly, on the salary scale £1575–£2025. The duties will be mainly concerned with psychotherapy.

Applications, naming 2 referees, should be sent to the Deputy Superintendent by 30th March.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Part-time ASSISTANT OPHTHALMOLOGISTS (Senior Hospital Medical Officer grade) for sessions at the following London County Council Vision Clinics :—

St. Christopher's School Treatment Centre, 40A, York-road, S.W.11. (Thursday P.M. or Friday P.M., weekly.)
Streatham S.T.C., 55, Lewin-road, S.W.16. (Monday A.M. and P.M., weekly.)
Putney S.T.C., 2, Clarendon-drive, S.W.15. (Wednesday A.M., weekly.)

Candidates, who may apply for any or all of the above sessions, should be interested and experienced in children's work. Duties will be undertaken in collaboration with the Divisional Medical Officer of the London County Council. Successful candidates will be required to take annual leave during the school vacations.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 30th March, 1957. Applicants may visit the various clinics by direct arrangement with the L.C.C. Divisional Medical Officer at "Southlands," Shuttleworth-road, S.W.11.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time ASSISTANT PHYSICIAN in Infectious Diseases (Senior Hospital Medical Officer grade) at the Western Hospital, Seagrave-road, S.W.6. Applicants should have had experience in infectious diseases in this country and preferably also in the management of respiratory complications of acute poliomyelitis. The Hospital has been designated a Regional Centre for this treatment.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 30th March, 1957. Applicants may visit the Hospital by local arrangement.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.

(1) CONSULTANT RADIOLOGIST (whole-time or maximum sessions), St. Charles' Hospital, Ladbroke-grove, W.10 (581 Beds).

Applications before 1st April, 1957.

(2) ASSISTANT PHYSICIAN in Physical Medicine (8 half-days a week). Senior Hospital Medical Officer grade, Watford Peace Memorial Hospital (208 Beds), West Herts Hospital, Hemel Hempstead (120 Beds), and associated hospitals.

Applications before 3rd April, 1957.

(3) CONSULTANT E.N.T. SURGEON (6 or 7 half-days a week), Edgware General Hospital, Edgware, Middlesex (638 Beds). Post vacant July, 1957.

Applications before 8th April, 1957.

(4) ASSISTANT PHYSICIAN (infectious diseases), whole-time, Senior Hospital Medical Officer grade, South Middlesex Hospital, Mogden-lane, Isleworth (145 Beds—approximately 90 for fevers, 1 surgical ward and ophthalmic unit). Successful candidate required to live within easy reach of the Hospital. Post offers excellent opportunity for postgraduate study for higher degrees.

Applications before 11th April, 1957.

Hospitals may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1.

ST. MARY'S HOSPITAL, Paddington, W.2. Applications are invited for the appointment of Part-time CONSULTANT in General Surgery. The successful candidate will be required to undertake up to 5 notional half-days per week with effect from 1st October, 1957.

Applications (14 copies), stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should be sent not later than 20th April, 1957, to the House Governor, St. Mary's Hospital, London, W.2, from whom further information may be obtained.

BRIGHTON AND LEWES HOSPITAL MANAGEMENT COMMITTEE. Full-time Locum CHEST PHYSICIAN required from 18th to 31st March, 1957.

Applications, giving age, qualifications and experience, with names and addresses of 2 referees, to be forwarded to Secretary, Brighton and Lewes Hospital Management Committee, Royal Sussex County Hospital, Brighton, 7.

KINGSTON HOSPITAL, Wolverton-avenue, Kingston UPON THAMES. KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from suitably qualified medical officers for the post of Locum ASSISTANT ORTHOPÆDIC SURGEON (Senior Hospital Medical Officer grade), for the period 23rd–30th March, 1957.

Applications, stating age, qualifications and experience, with 2 recent testimonials, should reach the Physician-Superintendent as soon as possible.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for appointment as SENIOR HOSPITAL MEDICAL OFFICER (Female) in Venereology to take up duty on 1st July, 1957. The appointment is for 4 notional half-days a week.

Apply by 23rd March, 1957, giving full particulars of age, qualifications, experience, &c., and details of present and previous appointments, together with the names of 3 persons to whom reference may be made, to the Secretary, 80, Rodney-street, Liverpool, 1.

LIVERPOOL REGIONAL HOSPITAL BOARD. Applications are invited for the post of CONSULTANT ANÆSTHETIST (whole-time or maximum part-time sessions) with duties mainly at St. Catherine's Hospital, Birkenhead, and some duties in hospitals in the Birkenhead and North Wirral Groups. Candidates must have had at least 5 years recognised training and experience in anæsthesia, and must be Fellows of the Faculty of Anæsthetists or already hold a Consultant post.

Forms of application from Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 19, James-street, Liverpool, 2, to be returned not later than 23rd March, 1957.

VINCENT COLLINGE, Secretary to the Board.

LIVERPOOL REGIONAL HOSPITAL BOARD. Applications are invited for the post of Part-time CONSULTANT ANÆSTHETIST on maximum sessions with duties mainly at hospitals in the St. Helens and Warrington Groups. Candidates must have had at least 5 years recognised training and experience in anæsthesia, and must be Fellows of the Faculty of Anæsthetists, or already hold a Consultant post.

Forms of application from Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 19, James-street, Liverpool, 2, to be returned not later than 23rd March, 1957.

VINCENT COLLINGE, Secretary to the Board.

MANCHESTER REGIONAL HOSPITAL BOARD. Additional Part-time (8 half-days weekly) CONSULTANT TRAUMATIC AND ORTHOPÆDIC SURGEON to the Lancaster and Kendal Hospitals, &c. (mainly Royal Lancaster Infirmary, 200 Beds). Wide experience essential; appointee to live near Lancaster.

Application forms from Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by 19th March, 1957.

NEWCASTLE REGIONAL HOSPITAL BOARD. Locum Tenens SENIOR HOSPITAL MEDICAL OFFICER PSYCHIATRIST (whole-time) at St. George's Hospital, Morpeth, for a period of approximately 3 months. Married or single furnished accommodation available.

Applications, with names and addresses of 3 referees, to Regional Psychiatrist, Regional Hospital Board Benfield-road, Newcastle upon Tyne, 6, within 7 days.

OXFORD REGIONAL HOSPITAL BOARD. Consultant DERMATOLOGIST (part-time for 7 sessions a week) to the hospitals of the Swindon/Cirencester area. A new general hospital for the Swindon area is being built.

Applications (12 copies), giving experience, qualifications and the names of 3 referees, should reach the Secretary, 43, Banbury-road, Oxford, by 23rd March.

OXFORD. THE UNITED OXFORD HOSPITALS. Applications are invited for the post of CONSULTANT ANÆSTHETIST to the United Oxford Hospitals, whole-time or maximum part-time. Experience in anæsthesia for thoracic surgery desirable.

Applications (10 copies), stating age, qualifications and experience, should reach the undersigned not later than 16th March, 1957. E. J. R. BURROUGH, Administrator.

Radcliffe Infirmary, Oxford.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) at Netherne Hospital, Coulsdon, Surrey. D.P.M. and higher medical qualification required. E.E.G. experience desirable.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 23rd March, 1957. Applicants may visit Hospital by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) at Coldharbour M.D. Hospital, Sherborne, Dorset, in the Coldeast and Tatchbury Mount Group. Candidates should have D.P.M. and experience in psychiatry and hospital administration. Successful candidate will take part in the work of the Group in general and will have opportunities of participating in other local psychiatric services. 7-roomed bungalow available on estate if desired. If non-resident, person appointed will be required to live near Hospital.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 23rd March, 1957. Applicants may visit Hospital by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) at St. James' Hospital, Portsmouth, who will act as Medical Officer in charge of the E.E.G. Department. Candidates should possess D.P.M., and must have adequate E.E.G. experience.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 23rd March, 1957. Applicants may visit Hospital by local arrangement.

WEST CORNWALL CLINICAL AREA. South-Western REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of a CONSULTANT ANÆSTHETIST to the West Cornwall Clinical Area. The appointment may be held either on a whole-time or maximum (9 sessions) part-time basis. The successful candidate, who will be required to work mainly at the Royal Cornwall Infirmary, Truro, will also undertake regular sessions at the West Cornwall Hospital, Penzance, and at Falmouth Hospital. In addition, he may be required to visit other hospitals in the Clinical Area as determined by the Regional Board from time to time.

Applications (12 copies), stating date of birth, qualifications and experience together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 23rd March, 1957.

NEW ZEALAND. WELLINGTON HOSPITAL BOARD. Applications are invited from registered medical practitioners for the full-time position of ASSISTANT RADIOLOGIST at the Wellington Hospital. Applicants should qualify as Senior or Junior Specialists as defined in the New Zealand Hospital Employment Regulations, 1952. The position is subject to grading. The minimum salary in accordance with the Regulations for Senior Specialist is £2000 p.a., New Zealand Currency, and for Junior Specialist £1600 p.a., New Zealand Currency. Duties are to commence as soon as possible after the closing date of applications. Intending applicants should apply to the High Commissioner for New Zealand, 415, Strand, London, W.C.2, for a schedule of information regarding this position.

Applications close with the Secretary, Private Bag, Wellington Hospital, Wellington, New Zealand, at 9 A.M., on Tuesday, 23rd April, 1957. J. B. I. COOK, Secretary.

U.S.A. VIRGINIA. Progressive state mental hospital in Virginia, 4600 Beds, expanding staff, invites applications for PHYSICIANS at all levels, psychiatric experience desirable but not necessary. Salary from $8040 (approximately £2750). All modern methods of treatments. Opportunities for research. Good retirement plan.

Apply to JUUL C. NIELSEN, M.D., Superintendent, sending full résumé in first letter to Box 271, Petersburg, Virginia, U.S.A.

Hospital Services : Junior Appointments

ALBERT DOCK ORTHOPÆDIC AND FRACTURE HOSPITAL, Alnwick-road, E.16. SEAMEN'S HOSPITALS GROUP. SENIOR HOUSE OFFICER for Receiving-room duties required on 31st March. Post, which is normally resident, is recognised by the Royal College of Surgeons, and provides excellent experience in a wide variety of traumatic conditions received from the adjacent dockland and from shipping in the Port of London. Salary £745.

Applications, stating age, nationality, qualifications and experience, with the names of 2 recent referees, should be sent to the Secretary, Dreadnought Seamen's Hospital, Greenwich, not later than 9th March.

BATTERSEA GENERAL HOSPITAL, Battersea Park, S.W.11. HOUSE PHYSICIAN (House Officer grade), resident. Not pre-registration. Vacant early March.

Apply Hospital Secretary, enclosing copies of 2 recent testimonials.

BATTERSEA GENERAL HOSPITAL, Battersea Park, S.W.11. SURGICAL OFFICER (resident) Junior Hospital Medical Officer grade, vacant end of March.

Apply Hospital Secretary, enclosing copies of 2 recent testimonials.

BOLINGBROKE HOSPITAL, Wandsworth Common, S.W.11. HOUSE PHYSICIAN (resident) vacant 6th May, 1957. Open to registered practitioners and pre-registration candidates.

Apply Hospital Secretary, enclosing copies of 3 recent testimonials, by 13th March, 1957.

BROMPTON HOSPITAL, S.W.3. Applications invited for the following posts :—

RESIDENT SURGICAL OFFICER (post graded as Senior House Officer or Registrar, according to qualifications and experience), for 6 months from 1st May. 1957, with eligibility for reappointment. Candidates must have held a resident hospital appointment.

RESIDENT HOUSE PHYSICIAN (3 vacancies). 2 vacancies for 6 months from 1st May, 1957. Duties include work in Outpatient Department and wards. 1 vacancy for 9 months from 1st May, 1957. The first 3 months at Brompton Hospital Sanatorium, Frimley, and the following 6 months at the Hospital in London covering work in Outpatient Department and wards. Salary at the rate of £525 p.a.

Applications, stating age, qualifications with dates, nationality and appointments held, together with copies of testimonials, by 9th March, 1957, to—

KENNETH A. F. MILES, House Governor.

BROMPTON HOSPITAL, S.W.3. Applications invited for post of MEDICAL REGISTRAR (whole-time). Salary within the Registrar grade. The appointment is for 1 year, with eligibility for reappointment. Candidates must hold the M.R.C.P. Diploma or the M.B. of a university.

Applications, stating age, qualifications with dates, nationality and appointments held, together with copies of testimonials, by 9th March, 1957, to—

KENNETH A. F. MILES, House Governor.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. SENIOR REGISTRAR required for 2 or possibly more sessions in the Dermatological Department. Previous experience in dermatology essential. Post now vacant. Hospital may be visited by direct appointment.

Application forms from, and returnable to, Group Secretary, Hospital Management Committee, at Central Middlesex Hospital, Park Royal, N.W.10, by 12th March, 1957.

COLINDALE HOSPITAL, Colindale-avenue, London, N.W.9. (300 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time MEDICAL REGISTRAR (resident or non-resident) required at above Hospital, where all types of chest diseases are treated. Experience in diseases of the chest desirable. The Hospital which is within easy access of the centre of London, may be visited by direct appointment with the Physician-Superintendent.

Application forms obtainable from, and returnable to, Group Secretary, Edgware General Hospital, Edgware, by 9th March, 1957.

DREADNOUGHT SEAMEN'S HOSPITAL, Greenwich, S.E.10. CASUALTY AND RECEIVING-ROOM OFFICER (non-resident) required on 19th March. Post recognised by the Royal College of Surgeons. Salary £745 p.a.

Applications, stating age, nationality, qualifications, and experience, with the names of 3 recent referees, should be sent to the Secretary at the above address immediately.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from registered Women medical practitioners for the post of RESIDENT PATHOLOGIST. Salary in accordance with Ministry of Health scale for Senior House Officers. The appointment is for 6 months in the first instance. Duties to commence 1st April, 1957.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, Elizabeth Garrett Anderson Hospital, as soon as possible.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Whole-time NON-RESIDENT REGISTRAR (Radiodiagnostic Department), required.

Applications, stating age, qualifications, experience, names of 2 referees, to Secretary, Board of Governors, by 11th March.

HAMMERSMITH HOSPITAL AND INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY, Ducane-road, London, W.12. RESIDENT HOUSE SURGEON (obstetrics), required 1st May. Post recognised for M.R.C.O.G.

Applications, stating age, qualifications, experience, names of 2 referees, to Secretary, Board of Governors, by 11th March.

HIGHLANDS GENERAL HOSPITAL, Winchmore-hill, N.21. HOUSE PHYSICIAN, vacant 19th March, 1957. Preference given to applicants seeking pre-registration post under Medical Act, 1950.

Applications, with copies of 3 testimonials and name and address of 1 referee, to Hospital Secretary.

LAMBETH HOSPITAL, Brook-drive, S.E.11. Applications are invited for appointment as CASUALTY OFFICER falling vacant on 1st April, 1957. The position is graded as Senior House Officer, and is recognised for the F.R.C.S. The successful candidate will be required to do locum duties from 18th March, 1957.

Application forms from the Physician-Superintendent.

LONDON CHEST HOSPITAL. Hospitals for Diseases OF THE CHEST. A vacancy occurs 1st May for RESIDENT SURGICAL OFFICER. Appointment for 6 months, with prospect of renewal. Post graded as Senior House Officer or Registrar, according to qualifications and previous surgical experience.

Applications, stating date of birth, qualifications with dates, and previous appointments held, with copies of 3 testimonials, should reach the undersigned not later than 19th March.

THOMAS BROWN, House Governor.

London Chest Hospital, E.2.

METROPOLITAN HOSPITAL, Kingsland-road, London, E.8. Applications are invited from registered medical practitioners for the post of RESIDENT SENIOR HOUSE OFFICER (Anæsthetist), vacant 21st March, 1957. The post is recognised for the F.F.A.R.C.S.

Apply, stating age, nationality, qualifications, and experience, together with 2 testimonials, to Hospital Secretary by 15th March, 1957.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of HOUSE PHYSICIAN at The National Hospital, Queen-square, W.C.1. This post carries the grade of Registrar. The appointment will be for 1 year and will be renewed in exceptional circumstances.

Applications, with names of 3 referees, to be sent to the undersigned not later than 4th March, 1957.

H. EWART MITCHELL,
Secretary to the Board of Governors.

The National Hospitals for Nervous Diseases,
Queen-square, W.C.1.

NELSON HOSPITAL, Kingston-road, Merton, S.W.20. RESIDENT ANÆSTHETIST (Senior House Officer grade). Post approved for the D.A. Vacant end of March.

Applications, stating age, experience and qualifications, with copies of testimonials and the name of 1 referee, should be sent to the Group Secretary, St. Helier Hospital, Carshalton, Surrey.

NORTH MIDDLESEX HOSPITAL, Edmonton, N.18. RESIDENT HOUSE ANÆSTHETIST (House Officer), required for 16th April. 6 months appointment. Post recognised for D.A. and F.F.A. R.C.S. Whole-time duties under supervision of Senior Anæsthetists.

Applications, stating age, nationality, qualifications, experience, with copies of recent testimonials, to Secretary of Hospital, by 12th March.

PADDINGTON GREEN CHILDREN'S HOSPITAL. (ST. MARY'S HOSPITAL, W.2.) Applications are invited for the post of CASUALTY OFFICER. Post-registration appointment, non-resident, House Officer grade, tenable for 6 months, as from 1st May, 1957.

Applications, stating age, nationality, qualifications with dates, and experience, with copies of 3 recent testimonials, should reach the Secretary not later than 16th March, 1957.

PADDINGTON GENERAL HOSPITAL, Harrow-road, W.9. Applications are invited for the post of SENIOR HOUSE OFFICER (tuberculosis), non-resident. In addition to the 51 tuberculosis and non-tuberculosis pulmonary beds, the post entails the care of 32 medical beds.

Applications, stating age, qualifications, experience, together with names and addresses of 2 referees, to be sent to Secretary of Committee by 11th March.

QUEEN MARY'S (ROEHAMPTON) HOSPITAL, London, S.W.15. (408 Beds.) REGISTRAR (radiology) required whole-time. National Health Service terms and conditions.

Applications (4 copies), giving nationality, date of birth, qualifications and experience, present appointments, and names of 3 referees, should reach the Secretary, Ministry of Health, Division 4(v), Norcross, Blackpool, Lancashire, by 23rd March, 1957.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. HOUSE SURGEON (Male or Female), House Officer third post, 6 months commencing 16th March, 1957. Post recognised for F.R.C.S.

Applications, with the names of 3 referees, to Hospital Secretary by 9th March, 1957.

ROYAL MARSDEN HOSPITAL, Fulham-road, S.W.3. Applications are invited for a full-time appointment of REGISTRAR in the Radiotherapy Department from March, 1957. Salary £850 p.a. Candidates not holding a Diploma in Medical Radiology will be considered, especially if they have a higher qualification in medicine or surgery.

Forms of application are obtainable from the House Governor, to whom applications, together with the names of 3 referees, should be sent by 8th March, 1957.

ROYAL FREE HOSPITAL, London, AND NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of SENIOR ORTHOPÆDIC REGISTRAR (non-resident) at the Royal Free Hospital and Heatherwood Orthopædic Hospital, Ascot, Berks. 14–2 years will be spent at the Royal Free Hospital and a similar period at Heatherwood Orthopædic Hospital (200 Beds), which is a Regional Orthopædic Centre. Experience may be gained in long-term orthopædic surgery and the successful candidate would be expected to participate in the Windsor Accident Service whilst at Heatherwood.

Application forms may be obtained from the Secretary, Board of Governors, Royal Free Hospital, Gray's Inn-road, W.C.1, and should be returned by 21st March. 1957.

ST. MARY'S HOSPITAL, Paddington, W.2. Applications are invited from suitably qualified registered practitioners for the post of Locum RESIDENT ANÆSTHETIST (graded Senior House Officer), for the period 27th March–31st May, inclusive.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 16th March, 1957.

ST. MARY'S HOSPITAL, Paddington, W.2. Applications are invited for the post of NON-RESIDENT SURGICAL REGISTRAR. The F.R.C.S. qualification is desirable. The appointment is for a first period of 12 months as from a date to be arranged. The successful candidate will be required to work half-time in the Surgical Unit and half-time in the Casualty Department and will be expected to take up his duties as soon as possible.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 12th March, 1957.

ST. NICHOLAS HOSPITAL, Tewson-road, Plumstead, S.E.18. HOUSE PHYSICIAN, vacant mid-March. Recognised for pre-registration purposes.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ST. STEPHEN'S HOSPITAL, Chelsea, S.W.10. South WEST METROPOLITAN REGIONAL HOSPITAL BOARD. OBSTETRIC AND GYNÆCOLOGICAL REGISTRAR (non-resident).

Application forms obtained from the Group Secretary, St. Luke's Hospital, Sydney-street, London, S.W.3, to be returned within 14 days of date of advertisement. (Enclose foolscap stamped addressed envelope.)

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. Applications are invited for 3 posts of Whole-time ASSISTANT MEDICAL REGISTRARS (Registrar grade), 2 vacant in April and 1 on 18th May, 1957.

Further particulars and forms of application, which must be returned not later than 18th March, 1957, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. Applications are invited for the post of SURGICAL REGISTRAR, falling vacant on 1st July, 1957. The appointment is whole-time, non-resident, and is graded as that of a Senior Registrar.

Full particulars and form of application which must be returned not later than Monday, 8th April, 1957, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy on 15th June, 1957, for a HOUSE PHYSICIAN (Senior House Officer).

Further particulars and form of application, which must be returned not later than 8th April, 1957, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

UNIVERSITY COLLEGE HOSPITAL, Gower-street, W.C.1. Applications are invited for the post of RESIDENT PATHOLOGIST (grade Senior House Officer) in the Department of Clinical Pathology for 1 year from 1st June, 1957.

Applications, with names of 2 referees, to Administrator and Secretary by 18th March, 1957.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (No. 10) HOSPITAL GROUP. Applications are invited from fully registered medical practitioners for the post of HOUSE OFFICER in the Geriatric Unit at above Hospital. The post offers excellent scope for persons interested in this specialty as the most modern methods of geriatric treatment are employed.

Application forms from the Hospital Secretary, to be returned by 11th March, 1957.

WHITTINGTON HOSPITAL, London, N.19. Anæsthetic REGISTRAR required. Post recognised for F.F.A.R.C.S. and D.A. Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, the Secretary, 46, Cholmeley-park, N.6. by 11th March, 1957.

ABERDEEN ROYAL MENTAL HOSPITAL, Aberdeen, KINGSEAT MENTAL HOSPITAL, NEWMACHAR. The undernoted medical staff required for the above Hospitals where all forms of modern treatment are undertaken and where there is association with the University Department of Mental Health.

SENIOR HOUSE OFFICERS. Salary £745 p.a., less £150 for board, &c.

HOUSE OFFICERS (fully registered). Salary £525 p.a., less £125 for board, &c.

Locum Tenens arrangements may be available in the event of permanent appointments not being made.

Applications, giving full details of age, &c., to the appropriate Physician-Superintendent.

ACCRINGTON. VICTORIA HOSPITAL. (114 Beds.) BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required immediately. Post recognised for F.R.C.S. and approved for pre-registration purposes.

Applications to Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn, Lancs.

ASHFORD HOSPITAL, Ashford, Middlesex. (560 Beds.) STAINES GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT HOUSE SURGEONS (Male) for general surgical duties. 6 months appointment vacant: (1) 5th March, (2) 1st April. Preference given to pre-registration candidates.

Applications, stating age, qualifications and experience, with copies of up to 3 recent testimonials, to Medical Director of Hospital.

BIRMINGHAM. UNITED BIRMINGHAM HOSPITALS. BIRMINGHAM AND MIDLAND HOSPITAL FOR WOMEN, Showell Green-lane, SPARKHILL, BIRMINGHAM, 11. Applications are invited from registered medical practitioners for the post of RESIDENT GYNÆCOLOGICAL HOUSE SURGEON for duty with the Professorial Unit from 1st June, 1957. The appointment is recognised for the M.R.C.O.G. and D.Obst. R.C.O.G.

Application forms, obtainable from the House Governor at the above address, to be returned not later than 30th March, 1957. G. A. PHALP, Secretary.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. THE BIRMINGHAM MATERNITY HOSPITAL. Applications are invited from registered medical practitioners for the post of RESIDENT OBSTETRIC HOUSE SURGEON, vacant 1st May, 1957. The appointment is recognised for the M.R.C.O.G. and D.Obst.R.C.O.G.

Application forms obtainable from the House Governor, the Birmingham and Midland Hospitals for Women, Showell Green-lane, Sparkhill, Birmingham, 11, to be returned not later than 14th March, 1957. G. A. PHALP, Secretary.

BIRMINGHAM ACCIDENT HOSPITAL, Bath-row, BIRMINGHAM, 15. (215 Beds and 8 House Surgeons.) HOUSE SURGEONS (resident), vacant now. Hospital largest Traumatic Unit in country and treats over 50,000 new patients each year. Recognised for purpose of Casualty by R.C.S.(Eng.). Teaching programme by Consultant staff. 6 months appointment, some of which can be spent in 42-Bedded Medical Research Council's Burns Unit.

Apply, naming 2 referees, to Administrator within 7 days.

BIRMINGHAM GROUP 9 HOSPITAL MANAGEMENT COMMITTEE. Whole-time JUNIOR HOSPITAL MEDICAL OFFICER for mental deficiency group of 1358 Beds. Scope for training in modern treatment methods. Recognised for D.P.M. Resident (single accommodation only) or non-resident.

Application forms may be obtained from the Secretary, Coleshill Hall Hospital, Coleshill, Birmingham.

BIRMINGHAM, 9. LITTLE BROMWICH GENERAL HOSPITAL. PÆDIATRIC HOUSE PHYSICIAN (Male/Female), vacant 1st April, 1957. Recognised for D.C.H., includes duties on infectious diseases wards, Neo-natal Department, and clinics.

Apply Physician-Superintendent.

BIRMINGHAM, 29. SELLY OAK HOSPITAL. (955 equipped beds.) ASSISTANT CASUALTY OFFICER (Senior House Officer). Post vacant 1st April, 1957. Resident or non-resident. Recognised for F.R.C.S.

Applications, giving qualifications, experience, age, and copies of 3 recent testimonials, to the Medical Superintendent.

BARNSTAPLE. NORTH DEVON INFIRMARY. (105 Beds.) HOUSE SURGEON required. Recognised pre-registration appointment; the post can be taken up immediately.

Applications to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

BARROW-IN-FURNESS. NORTH LONSDALE HOS-PITAL. Applications are invited for the resident post of HOUSE OFFICER (medical) at the above Hospital. Recognised for pre-registration. Available in March, 1957.

Applications to Group Secretary, Barrow and Furness Hospital Management Committee, 105, Abbey-road, Barrow-in-Furness.

BARROW AND FURNESS HOSPITAL MANAGEMENT COMMITTEE. OBSTETRIC AND GYNÆCOLOGY DEPARTMENT. Applications are invited for the resident post of SENIOR HOUSE OFFICER at the Risedale Maternity Hospital, Barrow-in-Furness. Post available from 1st April, 1957. Hospital approved for D.Obst.R.C.O.G.

Applications to the Group Secretary, 105, Abbey-road, Barrow-in-Furness.

BEBINGTON, CHESHIRE. CLATTERBRIDGE HOS-PITAL. (819 Beds.) CENTRAL WIRRAL GROUP. JUNIOR HOSPITAL MEDICAL OFFICER (casualty/orthopædics) (resident) or LOCUM required. Salary in accordance with current terms and conditions of service—i.e., £775–£50–£1075 p.a., less £170 p.a. for residence.

Application forms, obtainable from Group Secretary, to be returned as soon as possible.

BECKENHAM HOSPITAL, Kent. (100 Beds.) House SURGEON required at above Hospital. Recognised for F.R.C.S. Pre-registration post.

Apply, stating age, nationality, qualifications, and experience, and naming 3 referees, to Administrative Officer.

BEDFORD GENERAL HOSPITAL. (439 Beds.) Locum ANÆSTHETIC REGISTRAR required early March, pending new appointment; probably for 4 weeks.

Detailed applications, with copies of 2 recent testimonials, to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BEDFORD GENERAL HOSPITAL. (439 Beds.) Applications required for the post of ANÆSTHETIC REGISTRAR, vacant early April. Resident or non-resident. Post recognised for the D.A. and F.F.A.R.C.S. This appointment gives good general experience with adequate Consultant supervision.

Application forms obtainable from, and returnable to, Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford. Closing date 8th March, 1957.

BEDFORD GENERAL HOSPITAL. (439 Beds.) House SURGEON required. Pre- or post-registration. Recognised for F.R.C.S. Post offers exceptional opportunities for general experience in busy acute Surgical Units.

Inquiries and applications, with copies of 2 recent testimonials, to Group Secretary, 3, Kimbolton-road, Bedford.

BOGNOR WAR MEMORIAL HOSPITAL. (32 Beds.) RESIDENT SENIOR HOUSE OFFICER required to work under visiting Consultant Surgeon and Physician; also casualty work. Salary £745, less £150 p.a. for residence. Modern fully equipped theatre. Good liaison with Chichester main hospitals and with local general practitioners. Also gives opportunity for postgraduate reading.

Apply, giving 3 referees names, to Group Secretary, Chichester Group Hospital Management Committee, 174, Broyle-road, Chichester.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. ASSISTANT PATHOLOGIST (Senior House Officer grade) required in Area Laboratory. Offers experience all branches of pathology. Salary £745.

Detailed applications to Group Secretary.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 acute beds.) ORTHOPÆDIC HOUSE SURGEON (first, second, or third post) vacant now. Offers good opportunity for general experience in busy acute general hospital. Approved pre-registration post. Fully qualified practitioners may apply. Recognised for F.R.C.S.

Apply Group Secretary.

BOSTON. GENERAL HOSPITAL. (80 Beds.) Sheffield REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (general surgery and E.N.T.) required with relief duties in the Casualty Department. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 11th March, 1957, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

BOURNEMOUTH (near). CHRISTCHURCH HOSPITAL, CHRISTCHURCH, HANTS. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of a RESIDENT SENIOR HOUSE OFFICER (surgical) for the above Hospital of 340 Beds, including a new Surgical Unit of 56 Beds. This is a new post which will become available towards the end of March and is consequent upon the upgrading of the Hospital. There is no emergency surgery undertaken at the moment, but the successful applicant will attend surgical outpatient sessions at the Royal Victoria Hospital.

Applications to the Hospital Secretary, Christchurch Hospital.

BRIGHTON AND LEWES HOSPITAL MANAGEMENT COMMITTEE GROUP HOSPITALS. SENIOR HOUSE OFFICER for duties in the E.N.T. Department of the above Group (78 Beds), vacant mid-March. Recognised for F.R.C.S. and D.L.O.

Applications, with details of experience, &c., together with the names of 2 referees, to be sent to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRIGHTON. NEW SUSSEX HOSPITAL FOR WOMEN, Windlesham-road. Locum HOUSE SURGEON (Female) Senior House Officer grading, required for the period 10th–22nd March, 1957, inclusive. Salary at the rate of £14 10s. per week, less residential emoluments.

Applications, with full particulars, to be sent to the Administrative Officer as soon as possible.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (312 Beds.) HOUSE SURGEON required immediately. Recognised for pre-registration and F.R.C.S.

Applications, stating usual particulars and naming 2 referees, to the Administrative Officer.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (312 Beds.) 2 HOUSE PHYSICIANS required beginning of April and May. Pre-registration.

Applications, stating usual particulars, and naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRIGHTON, 7. ROYAL SUSSEX COUNTY HOSPITAL. SENIOR CASUALTY OFFICER (Junior Hospital Medical Officer), non-resident, required at the above Hospital. Vacant now. Recognised for F.R.C.S.

Applications, stating usual particulars and the names of 2 referees, to the Administrative Officer.

BRISTOL. COSSHAM/FRENCHAY HOSPITAL MAN-AGEMENT COMMITTEE. SENIOR HOUSE OFFICER (general surgery) required for duties at Frenchay Hospital and at Cossham Memorial Hospital. Resident appointment, unmarried accommodation only. Post vacant 25th May, 1957. Tenable for 1 year. Recognised under R.C.S. Fellowship regulations.

Applications, naming 2 referees, to the Group Secretary, Frenchay Hospital, Bristol, by 21st March, 1957.

BROXBURN, WEST LOTHIAN. BANGOUR GENERAL HOSPITAL. (15 miles from Edinburgh.) Applications are invited for the post of HOUSE OFFICER in the General Surgical Unit of Bangour General Hospital. Certain casualty duties. Pre-registration post. Salary and conditions of service in accordance with regulations.

Applications to Group Secretary and Treasurer, Board of Management, Bengour Hospital, Broxburn, West Lothian.

BURTON UPON TRENT. THE GENERAL HOSPITAL. Pre-registration HOUSE OFFICER (general surgery) required at the above Hospital which is recognised for the F.R.C.S.

Applications to Group Secretary as soon as possible.

BUXTON. DEVONSHIRE ROYAL HOSPITAL. (252 Beds.) Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER. This Hospital is a large Special Hospital for the treatment and rehabilitation of all types of locomotor disorders. Duties are mainly medical and include work in the long-stay unit of the Manchester University Rheumatism Research Centre. The Hospital is recognised under the regulations for the Diploma in Physical Medicine, Part 2, and the post also offers good medical experience.

Applications, stating age, experience, and qualifications, together with the names of 2 persons for reference, to be addressed to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

CHICHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER in Medicine required, working under supervision of Consultant Physicians with main duties in Geriatric Unit (150 Beds), St. Richard's Hospital (400 Beds). Facilities available for investigation and treatment of acute and chronic disease, pre-admission assessment, and follow-up clinic. Resident or non-resident. National Health Service terms and conditions of service. Salary £775–£50–£1075 p.a.

Applications, stating age, nationality, qualifications, and experience, and naming 2 referees, to Group Secretary, 174, Broyle-road, Chichester.

CHICHESTER. ST. RICHARD'S HOSPITAL. (400 Beds.) CHICHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of RESIDENT SURGICAL OFFICER (Registrar status) vacant 14th May next for 1 year in first instance. Hospital recognised for F.R.C.S. Salary £850 first year, less £170 p.a. for residence.

Forms of application from Group Secretary, 174, Broyle-road, Chichester.

CARDIFF. THE UNITED CARDIFF HOSPITALS AND THE WELSH REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR in Urology. The appointment is a joint one between the United Cardiff Hospitals and the Welsh Regional Hospital Board, the time divided equally between the 2 Boards.

Application forms are available from the Secretary to the Board of Governors, United Cardiff Hospitals, Cardiff Royal Infirmary, Cardiff, and should be returned within 14 days of the appearance of this advertisement.

CARDIFF (near). CAERPHILLY AND DISTRICT MINERS' HOSPITAL. (226 acute general beds.) HOUSE SURGEONS (2 appointments) now vacant. Preference given to pre-registration candidates. The posts are recognised by the Royal College of Surgeons. 6 miles from the teaching Hospital at Cardiff.

Apply to Group Secretary, address as above.

CARSHALTON, SURREY. QUEEN MARY'S HOSPITAL FOR CHILDREN. (General Childrens' Hospital of 700 Beds.) HOUSE PHYSICIAN (Senior House Officer) required, care of acute medical, rheumatism and poliomyelitis Beds.

Applications, stating age, qualifications and experience, together with copies of 3 testimonials, should reach the Group Secretary by 16th March, 1957.

CARSHALTON, SURREY. QUEEN MARY'S HOS-PITAL FOR CHILDREN. (A General Children's Hospital of 700 Beds.) HOUSE SURGEON (House Officer), resident, required for 6 months (3 months general surgery, 3 months E.N.T. and orthopædics). Applicants must have completed 12 months Pre-registration Service.

Applications, stating age and qualifications, together with 1 recent testimonial and the names of 2 referees, should be submitted to the Group Secretary immediately.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botley's Park War Hospital). (430 Beds.) ORTHOPÆDIC HOUSE SURGEON required immediately. Senior House Officer or House Officer (Intern) grade. 100 orthopædic beds. Post recognised for F.R.C.S. and Pre-registration Service. Preference given to provisionally registered candidates. Salary in accordance with terms and conditions of National Health Service.

Applications, together with names and addresses of referees, to be sent to the Physician-Superintendent, St. Peter's Hospital, Chertsey, as soon as possible.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL. (430 Beds.) SURGICAL REGISTRAR. Post vacant April. F.R.C.S. preferred. Hospital may be visited by arrangement with the Physician-Superintendent (Tel. : Ottershaw 441).

Application forms can be obtained from, and should be returned by 11th March to, Secretary, Woking and Chertsey Hospital Management Committee, "Huntington," Chertsey, Surrey.

COLCHESTER HOSPITAL MANAGEMENT COM-MITTEE. Applications are invited for :—

Black Notley Hospital, Braintree (516 Beds)

Post of HOUSE SURGEON. Includes duties in general surgical and gynæcological wards. First, second, third or pre-registration post, tenable for 6 months. Recognised for F.R.C.S.

Post of ORTHOPÆDIC HOUSE OFFICER. Duties include care of cases from London Hospital Orthopædic Department. First, second, third or pre-registration post, tenable for 6 months. Recognised for F.R.C.S.

Essex County Hospital, Colchester (185 Beds)

Post of SENIOR HOUSE OFFICER to Casualty and E.N.T. Departments. Post tenable for 6 months or 1 year. Recognised for F.R.C.S.

Clacton and District Hospital (58 Beds)

Post of SENIOR HOUSE OFFICER (Resident Surgical Officer). Post tenable for 1 year.

Applications, with copies of 3 testimonials, to Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

COVENTRY AND WARWICKSHIRE HOSPITAL, Coven-TRY. SENIOR ASSISTANT (Junior Hospital Medical Officer grade) for accident and orthopædic wards. Appointment for 1 year in first instance, renewable annually up to 4 years. Recognised F.R.C.S. Previous experience desirable. Resident accommodation available.

Applications to Hospital Secretary.

CREWE AND DISTRICT MEMORIAL HOSPITAL. (108 Beds Acute, and continuation 32 Beds.) Pre-registration HOUSE OFFICER (surgical) required. (Approved for F.R.C.S.) Salary and conditions in accordance with Whitley Council scale.

Apply immediately, stating age, qualifications, &c., with names of 2 referees, to the Group Secretary, South Cheshire Hospital Management Committee, Barony Hospital, Nantwich, Cheshire.

CROYDON GROUP HOSPITAL MANAGEMENT COM-MITTEE. OBSTETRIC AND GYNÆCOLOGICAL REGISTRAR for duties mainly at Mayday Hospital (80 obstetric and 47 gynæcological beds) and St. Mary's Maternity Hospital (33 obstetric beds). Post recognised for M.R.C.O.G. Vacant 19th May, 1957.

Application forms obtainable from the undersigned.

GEORGE A. PAINES, Group Secretary.

General Hospital, London-road, Croydon.

DARLINGTON MEMORIAL HOSPITAL. (208 Beds.) Applications are invited for the post of RESIDENT HOUSE SURGEON (approved pre-registration appointment), which post is recognised for the F.R.C.S. (Eng.). Salary in accordance with national scale.

Apply, giving age and references, to the undersigned forthwith.

G. W. BECKWITH, Group Secretary.

DORCHESTER. DORSET COUNTY HOSPITAL. (109 Beds.) HOUSE PHYSICIAN (Male or Female) required for resident pre-registration post, vacant 1st April and tenable for 6 months.

Applications, stating age, experience, nationality, and qualifications, together with copy testimonials, to Group Secretary, West Dorset Hospital Management Committee, Damers-road, Dorchester, Dorset, immediately.

DOUGLAS. NOBLE'S ISLE OF MAN HOSPITAL. (160 Beds.) Applications are invited for the post of HOUSE SURGEON. The post is recognised for pre-registration purposes, and becomes vacant in mid-March, 1957. 4 residents on staff. Salary £425–£475 according to experience.

Applications, enclosing copies of 2 recent testimonials, to the Secretary, Noble's Hospital, Douglas, Isle of Man.

DRIFFIELD, YORKSHIRE. EAST RIDING GENERAL HOSPITAL. (247 Beds.) HOUSE SURGEON (first, second, or third post), required now. Casualty, general surgery, orthopædics, and some gynæcology. Approved pre-registration post. Fully qualified practitioners may apply.

Apply Group Secretary, Westwood Hospital, Beverley, Yorkshire.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. REGISTRAR in Psychiatry, St. Andrew's Hospital, Thorpe, Norwich (1250 Beds). Full range of modern psychiatric treatments and a number of associated general hospital outpatient clinics. Married or single quarters available. Appointment for 1 year, renewable for second year.

Applications, stating age, experience, and the names of 3 referees, to the Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 11th March, 1957. Candidates invited to visit Hospital by direct arrangement with Medical Superintendent.

EDGWARE GENERAL HOSPITAL. (715 Beds.) North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR (whole-time), resident, required in Department of Anæsthesia at above Hospital. Vacant 25th March, 1957. Hospital may be visited by direct appointment with Medical Director.

Application forms obtainable from, and returnable to, Group Secretary, Hendon Group Hospital Management Committee, Edgware General Hospital, Edgware, Middlesex, by 12th March, 1957.

EPPING. ST. MARGARET'S HOSPITAL. Resident SENIOR HOUSE OFFICER (obstetrics), vacancy occurring 1st April. Post recognised for D.Obst.R.C.O.G. Salary on national scale, less deduction for board, lodging, &c. Busy general hospital with easy access to London.

Applications, with 2 recent testimonials, to the Group Secretary, Epping Group Hospital Management Committee, "Oak Cottage," The Plain, Epping, Essex, by 8th March, 1957.

EPPING. ST. MARGARET'S HOSPITAL. Resident SENIOR HOUSE OFFICER (surgery), vacant 25th March, 1957. Post recognised for F.R.C.S. Busy general hospital with easy access to London. Salary on national scale, less deduction for board, lodging, &c.

Applications, with copies of 2 testimonials, to reach the Group Secretary, Epping Group Hospital Management Committee, "Oak Cottage," The Plain, Epping, Essex, by 15th March, 1957.

EPSOM GROUP HOSPITAL MANAGEMENT COM-MITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for Whole-time REGISTRAR in Chest Medicine to the Epsom and Dorking Chest Clinics. Immediate vacancy. Duties will include sessions at 1 or both clinics. Additionally person appointed will be Registrar at Cheam Sanatorium where there are 53 Beds for the treatment of cases of pulmonary tuberculosis, and will have the day-to-day care of patients under the various Consultants concerned. Successful candidate will be required to live within easy access of Cheam Sanatorium. Applicants may visit Units by arrangement with Consultant Chest Physician.

Application forms may be obtained from Group Secretary, Epsom District Hospital, Dorking-road, Epsom (send stamped addressed foolscap envelope), for completion and return within 14 days.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. Applications are invited from pre-registration and registered medical practitioners for the post of HOUSE SURGEON (general surgery), vacant 16th April, 1957.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary by 9th March, 1957.

GAINSBOROUGH. JOHN COUPLAND HOSPITAL. (40 medical and surgical beds.) Locum RESIDENT MEDICAL OFFICER required for the period 4th–29th March, inclusive. Salary £17 10s. per week.

Apply, with full particulars, to Group Secretary, County Hospital, Lincoln.

GLASGOW ROYAL INFIRMARY. Senior House Officer in Anæsthetics. Duties at above Infirmary.

Write, giving 3 names for reference, not later than 9th March, 1957, to the Secretary, Board of Management for Glasgow Royal Infirmary and Associated Hospitals, 135, Buchanan-street, Glasgow, C.1.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (150 Beds.) HOUSE SURGEON required, pre-registration post, vacant 11th March, 1957.

Apply, with testimonials, to Hospital Administrator, as soon as possible.

HASTINGS GROUP HOSPITAL MANAGEMENT COM-MITTEE. Locum ORTHOPÆDIC REGISTRAR required for whole-time duties. 6th March–20th March, 1957, inclusive. Remuneration £17 10s. per week. Non-resident.

Apply, giving details of qualifications and experience, to Group Secretary, Hastings Hospital Management Committee, 11, Holmesdale-gardens, Hastings.

HASTINGS AND ST. LEONARDS. BUCHANAN HOS-PITAL. (94 Beds.) HOUSE SURGEON in Gynæcology (28 gynæcological beds). Post recognised for M.R.C.O.G., vacant 23rd March, 1957, for 6 months. Candidates for Pre-registration Service (surgery) can be considered.

Apply, giving names and addresses of 3 referees, to Hospital Administrator.

HAREFIELD HOSPITAL, Harefield, Middlesex. North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. SENIOR MEDICAL REGISTRAR required at above Hospital. Applicants should hold a higher qualification in medicine and should have experience in general medicine and diseases of children as well as of the diagnosis and modern methods of treatment of tuberculosis. The post will normally be held for about 2 years and the successful candidate will then be given the opportunity of serving for a further 2 years, approximately, as a Senior Registrar at Uxbridge Chest Clinic, 259, High-street, Uxbridge, Middlesex. Hospital and Clinic may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, Harefield and Northwood Group Hospital Management Committee, Mount Vernon Hospital, Northwood, Middlesex, by 9th March, 1957.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. HOUSE SURGEON (pre-registration) required.

Applications, giving full details and copies of recent testimonials, should be sent to the Hospital Secretary at once.

HORNCHURCH. ST. GEORGE'S HOSPITAL, Ingre-BOURNE CENTRE. Temporary PSYCHIATRIC REGISTRAR required at above Unit. Mental Hospital experience essential. Candidates should be specially interested in short-term therapy and social psychiatry. Further information may be obtained from the Hospital which may be visited by arrangement (Tel.: Hornchurch 4181).

Applications, stating names of 2 referees, should be sent to Group Secretary, Romford Hospital Management Committee, Oldchurch Hospital, Romford, as soon as possible.

HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) Applications are invited for the post of CASUALTY OFFICER. The post, which is resident, is recognised under the Fellowship regulations and will be graded either Junior Hospital Medical Officer or Senior House Officer according to experience. Duties terminate at 7 P.M. with 1 night weekly on call.

Applications for the appointment, which will be vacant on 1st April, 1957, should be accompanied by copies of 3 recent testimonials and addressed to—

H. J. JOHNSON, Group Secretary.

The Royal Infirmary, Huddersfield.

HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required commencing duties immediately. The post is recognised as a pre-registration appointment and for the F.R.C.S. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Secretary to the Management Committee.

The Royal Infirmary, Huddersfield.

IPSWICH AND EAST SUFFOLK HOSPITAL. Heath ROAD WING, IPSWICH. (280 Beds.) Applications invited for post of NON-RESIDENT CASUALTY OFFICER (Senior House Officer), vacant 7th March, 1957. Day-time duties only, offering opportunity of study for higher examinations.

Applications, with full details, to the Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER in General Medicine, vacant on 18th March, 1957. The post offers excellent experience and opportunity for working for higher qualifications (M.R.C.P.). There are approximately 50 acute medical beds.

Applications, stating age, nationality, together with copies of recent testimonials, to Hospital Secretary by 4th March.

IPSWICH. ST. HELEN'S HOSPITAL. (100 Beds for infectious diseases, pulmonary tuberculosis, and long-stay orthopædics. The area Chest Clinic is in the Hospital.) HOUSE PHYSICIAN required (post-registration appointment). Accommodation available for married man.

Applications to JOHN WILLIAMS, Group Secretary, Ipswich Group Hospital Management Committee, at the Ipswich and East Suffolk Hospital (Anglesea Road Wing), Ipswich.

LANCASTER. ROYAL LANCASTER INFIRMARY. (240 Beds.) RESIDENT HOUSE OFFICER (surgical), pre-registration post. Successful applicant will work with Consultant Surgical Unit and attend Consultative Clinics. Post vacant now; tenable for 6 months. Recognised for F.R.C.S.

Applications, with names of 2 referees, to the Secretary (S), Royal Lancaster Infirmary, Lancaster.

LANCASTER MOOR HOSPITAL, Lancaster. (Regional MENTAL HOSPITAL.) MANCHESTER REGIONAL HOSPITAL BOARD. Applications invited for the post of RESIDENT REGISTRAR (Male or Female). Unfurnished house or flat in hospital grounds available for married applicants; furnished quarters for single persons. Hospital recognised for D.P.M. and facilities provided for attending courses of instruction at neighbouring universities. All modern methods of investigation and treatment carried out; successful candidate required to work under supervision of Consultant Psychiatrists by rotation, both for inpatient and outpatient work.

Apply Medical Superintendent.

LANCASTER MOOR HOSPITAL, Lancaster. (Regional MENTAL HOSPITAL.) Applications invited for the post of RESIDENT JUNIOR HOSPITAL MEDICAL OFFICER (Male or Female). Unfurnished flat available for married applicants; furnished quarters for single persons. Hospital recognised for D.P.M. and facilities granted for attending neighbouring universities. All modern methods of investigation and treatment carried out; outpatient clinics; Hospital serving North Lancashire and Lake District. Post for initial period of 4 years, but renewable if services satisfactory.

Apply Medical Superintendent.

LANCASTER. BEAUMONT HOSPITAL. Resident SENIOR HOUSE OFFICER for newly-constructed E.N.T. ward and theatre unit (22 Beds). Relevant outpatient attendances during 1956—5100 (1973 new patients).

Applications, with names of 2 referees, to Group Secretary, Royal Lancaster Infirmary, Lancaster.

LEEDS, 7. CHAPEL ALLERTON HOSPITAL. (255 Beds.) SENIOR HOUSE OFFICER (surgical) required. National Health Service terms and conditions.

Apply Medical Superintendent.

LEEDS REGIONAL HOSPITAL BOARD. Short-term LOCUM TENENS appointments in the Registrar grade are constantly available at hospitals in the area of the Board, particularly in the specialties of anæsthetics, general medicine, general and orthopædic surgery, and psychiatry.

Interested practitioners, suitably experienced, should communicate with the Secretary, Joint Registrars Committee, Park-parade, Harrogate.

LEEDS REGIONAL HOSPITAL BOARD. Registrar vacancies.

General Medicine

St. James's Hospital, Leeds (206 general medical beds). Duties those of Resident Medical Officer.

Urology

Bradford Royal Infirmary (65 urology beds). Approximately one-fifth of the duties will be general surgical. Non-resident. Post vacant end of June.

Radiotherapy

Regional Radium Institute, Bradford (50 Beds), preferably resident. Unit provides a complete Radiotherapy Service for approximately 1,000,000 population.

Applications, stating age, qualifications and details of present and previous appointments with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 14th March, 1957.

LEEDS REGIONAL HOSPITAL BOARD. Senior Regis-TRAR vacancies.

Dermatology

Bradford Royal Infirmary (57 dermatological beds), large Outpatients Department, over 4000 new cases annually. Non-resident.

Ophthalmology

Royal Eye and Ear Hospital, Bradford (34 ophthalmic beds). Any additional duties as may be required at other hospitals in the Bradford A and B Hospital Management Committee Groups. Non-resident.

Child Psychiatry

Person appointed will be under training at the Leeds University Department of Psychiatry and associated clinics and will have experience at the Local Authority Child Guidance Department and at a special school for maladjusted boys.

Radiology

General Infirmary at Leeds (7 notional half-days per week) and the County Hospital, York (4 notional half-days per week).

Applications, stating age, qualifications and details of present and previous appointments with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 21st March, 1957.

LEEDS. THE UNIVERSITY OF LEEDS. UNITED LEEDS HOSPITALS. Applications are invited for appointment as SENIOR REGISTRAR AND TUTOR IN DERMATOLOGY at a salary on the scale £1100–£100–£1400 a year.

Applications (3 copies), stating date of birth, qualifications, details of present and previous appointments with dates, and experience of teaching, together with the names of 3 referees, should reach the Registrar, The University, Leeds, 2 (from whom further particulars may be obtained), not later than 25th March, 1957.

LEEDS. THE UNITED LEEDS HOSPITALS. The GENERAL INFIRMARY AT LEEDS. REGISTRAR required for the Radiotherapy Centre. Candidates with D.M.R. preferred. The post will be tenable for 1 year in the first instance and renewable for a second. Terms and conditions of service for hospital medical staff apply.

Applications, stating age, qualifications, previous post with dates, with 3 names for reference, should be sent to the Sub-Dean, School of Medicine, Leeds, 2, by Wednesday, 13th March, 1957.

LEEDS. UNITED LEEDS HOSPITALS/LEEDS REGIONAL HOSPITAL BOARD. SENIOR REGISTRAR in Obstetrics and Gynæcology, Halifax Group of hospitals—duties mainly at Halifax General Hospital (108 obstetric and 41 gynæcology beds). Subject to satisfactory progress the person appointed will be given an opportunity of undertaking at least 1 years training at the Teaching Hospital.

Applications, stating age, qualifications and details of present and previous appointments with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 21st March, 1957.

LIVERPOOL, 20. BOOTLE HOSPITAL. Applications are invited for a post as CASUALTY OFFICER (Junior Hospital Medical Officer grade) at this busy Hospital. The post will be vacant from 1st March, 1957.

Apply to Secretary, Walton Hospital, Liverpool, 9, giving details of experience, qualifications, age, date of registration, and names of 2 referees.

LIVERPOOL, 14. BROADGREEN HOSPITAL. Applica-tions are invited for the appointment of HOUSE SURGEON or SENIOR HOUSE OFFICER (resident) in the Thoracic Surgical Unit for 6 months from 1st March, 1957. The appointment is recognised for pre-registration purposes and the grading will be according to the experience of the applicant appointed. Salary, House Surgeon £425–£475–£525, less £125 p.a. resident charges; Senior House Officer £745 p.a., less £150 p.a.

Application forms obtainable from the undersigned, to be returned completed as soon as possible.

H. BLYTHE, Group Secretary.

LIVERPOOL, 22. WATERLOO HOSPITAL. Applications are invited for the post of RESIDENT MEDICAL OFFICER (Junior Hospital Medical Officer grade) at the above Hospital. Successful applicant will share duties with another officer of equal grading.

Apply to the Secretary, Walton Hospital, Liverpool, 9, stating age, qualifications, experience, names of 2 referees, and date when available for duties.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. LIVERPOOL EAR, NOSE AND THROAT INFIRMARY. Applications are invited for temporary appointment to a post of REGISTRAR in Otorhinolaryngology to take up duty as soon as possible for the period to 30th September, 1957. The vacancy for the year beginning 1st October, 1957, will be advertised in the summer of 1957 and the person holding the temporary appointment will be free to apply. The tenancy of a furnished flat may be available if required for the successful applicant.

Apply by 15th March, 1957, on form obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. ST. PAUL'S EYE HOSPITAL. Applications are invited for temporary appointment to a post of REGISTRAR in Ophthalmology to take up duty as soon as possible for the period to 30th September, 1957. The vacancy for the year beginning 1st October, 1957, will be advertised in the summer of 1957 and the person holding the temporary appointment will be free to apply. The tenancy of a furnished flat may be available if required for the successful applicant.

Apply by 15th March, 1957, on form obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LINCOLN. ST. GEORGE'S HOSPITAL. (204 Beds. Recognised for training for F.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (orthopædics) with outpatient clinic duties at the County Hospital, Lincoln, required. There are 42 orthopædic beds. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 11th March, 1957, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

MAIDENHEAD HOSPITAL, St. Luke's-road, Maiden-HEAD. RESIDENT SURGICAL REGISTRAR required.

Application forms from, and returnable to, Secretary, Windsor Group Hospital Management Committee, Alma-road, Windsor, by 17th March.

MAIDENHEAD HOSPITAL, St. Luke's-road, Maiden-HEAD. Locum HOUSE PHYSICIAN required immediately.

Applications to Secretary.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE SURGEON, 6 months appointment. Post vacant now Salary at the rate of £425–£525 p.a. A deduction at the rate of £125 a year is made for board and lodging, and other services provided.

Applications should be forwarded, as soon as possible, to the Administrative Officer at the Hospital.

MALVERN. ST. WULSTAN'S HOSPITAL. (230 Beds.) RESIDENT MEDICAL OFFICER (Junior Hospital Medical Officer) required. Good experience in modern treatment of pulmonary tuberculosis. Work mainly medical but Hospital has own Thoracic Surgical Unit.

Applications to Physician-Superintendent.

MANCHESTER. BOOTH HALL AND MONSALL HOS-PITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (pathology), resident, required to assist the Director of Pathology for the Group. Salary £745 p.a., less £150 p.a. for residence. Post tenable for 1 year in the first instance.

Applications to be sent as soon as possible to the Group Secretary, Booth Hall Hospital, Manchester, 9.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. SENIOR HOUSE OFFICER (surgical) to commence on 8th May, 1957. Whole-time, mainly non-resident training post, tenable for 6 months, renewable for a second 6 months. Duties allotted in Orthopædic, Surgical Outpatients, and General Surgical Units in rotation. Resident alternate nights for about 3 months when attached to Orthopædic Unit.

Application form obtainable from the undersigned, to be returned by 16th March, 1957. G. H. TAYLOR, Secretary.

MANCHESTER, 8. CRUMPSALL HOSPITAL. Applica-tions are invited for the non-resident post of JUNIOR HOSPITAL MEDICAL OFFICER in this active Geriatric Unit, vacant 1st May, 1957.

Applications, with names of 2 referees, by 11th March, 1957, to Group Secretary, North Manchester Hospital Management Committee, Crumpsall Hospital, Manchester, 8.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Locum REGISTRAR in Orthopædics required from 1st to 19th April, 1957.

Applications, with full details, to the Group Secretary at above address.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (obstetrics and gynæcology), vacant on 1st April, 1957. The Hospital takes part in undergraduate medical teaching, and the post is recognised in obstetrics and gynæcology for M.R.C.O.G. purposes.

An application form should be obtained from the Group Secretary at the Hospital and returned within 7 days of the appearance of this advertisement.

MANCHESTER REGIONAL HOSPITAL BOARD. Resident SURGICAL REGISTRAR required beginning of April, for the Royal Infirmary, Blackburn, a busy acute hospital of 262 Beds. Post recognised for F.R.C.S.

Application forms available from Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

MANCHESTER REGIONAL HOSPITAL BOARD. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE, WITHINGTON HOSPITAL, MANCHESTER, 20. The Board invites applications for the post of REGISTRAR in Pathology, Group Laboratory, Withington Hospital (1088 Beds). The laboratory is recognised for the D.Path. examination, and facilities are available for training in all branches of clinical pathology.

Applications, stating age, qualifications, present post, experience, and names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20, to arrive not later than 15th March, 1957.

MANCHESTER REGIONAL HOSPITAL BOARD. Senior REGISTRAR in Psychiatry in the Bolton and District Group of hospitals (164 psychiatric beds). Good facilities for both outpatient and inpatient investigation and treatment. Arrangements may later be made for the successful candidate to undertake a period of duty of approximately 1 year at Prestwich Mental Hospital, near Manchester.

Application forms, obtainable from the Senior Administrative Medical Officer, Cheetwood-road, Manchester, 8, should be returned by 18th March, 1957.

MARGATE. GENERAL HOSPITAL. (132 Beds.) Senior HOUSE OFFICER (surgical). Recognised for F.R.C.S. and D.A. Salary £745 p.a., less charge for residential emoluments.

Applications, with copies of testimonials, to Hospital Secretary.

MITCHAM. WILSON HOSPITAL, Cranmer-road, MITCHAM, SURREY. RESIDENT SENIOR HOUSE SURGEON (not recognised for F.R.C.S.), vacant end of March. This post in small but busy general hospital provides good and varied experience in diagnosis, treatment, and operative procedure.

Applications, stating age, qualifications, and experience, and the names of referees, to be sent to the Group Secretary, St. Helier Hospital, Carshalton, Surrey.

NEWCASTLE REGIONAL HOSPITAL BOARD. REGISTRAR OBSTETRICIAN AND GYNÆCOLOGIST (whole-time), resident, for duties at Dilston Hall Maternity Home, Hexham (50 Beds) and Newcastle General Hospital (100 obstetrical and gynæcological beds). Initial appointment at Dilston Hall. The post is recognised for the M.R.C.O.G. and Newcastle General Hospital is a Teaching Unit.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, by 14th March, 1957.

NEWMARKET GENERAL HOSPITAL, Suffolk. Senior HOUSE SURGEON (Senior House Officer grade). Tenable for 6 months in first instance. Duties mainly surgical, but a small amount of E.N.T. and ophthalmic surgery is included. Preference to candidates who wish to be trained in surgical technique and to gain experience in operative surgery.

Applications, with copies of 3 testimonials, to Medical Superintendent.

NORTHAMPTON GENERAL HOSPITAL. (482 Beds.) Vacancies 1st April, 1957, for the following :—

HOUSE OFFICER (general surgery). Recognised for F.R.C.S.

HOUSE OFFICER (Department of Anæsthetics). Recognised for D.A.

HOUSE OFFICER (Fracture and Orthopædic Department). Recognised for F.R.C.S.

HOUSE OFFICER (Casualty Department). Recognised for F.R.C.S.

HOUSE OFFICER (Dermatological Department) (Harborough Road Hospital).

SENIOR HOUSE OFFICER (Casualty Department). Recognised for F.R.C.S.

SENIOR HOUSE OFFICER (Department of Pathology).

SENIOR HOUSE OFFICER (Department of Anæsthetics). Recognised for D.A. & F.F.A.R.C.S.

All posts, except those of Anæsthetic House Officer, Dermatological House Officer and Senior House Officer, recognised for pre-registration. (Casualty House Officer recognised for medical pre-registration.) All 6 months appointments in first instance.

Applications, enclosing copies of 3 testimonials, as soon as possible, to S. G. HILL, Superintendent.

NOTTINGHAM CHILDREN'S HOSPITAL. (136 Beds. Recognised for the D.C.H.) Applications are invited for the post of SENIOR HOUSE OFFICER (surgical) which is now vacant. The post is tenable for 6 months or a year by agreement.

Applications, with copies of 2 testimonials, should be sent to the Secretary, Nottingham Children's Hospital, Chestnut-grove, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Senior House OFFICER (anæsthetics) required about 17th March, 1957. The post is recognised for the D.A. and the F.F.A.R.C.S. This is a busy General Hospital giving experience in all branches of surgery.

Applications, stating age, nationality, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER (casualty); duties to commence early March. Establishment 3. Recognised for F.R.C.S. Post offers wide experience of casualty work.

Applications, stating age, nationality, qualifications and experience, together with copies of testimonials, to be sent to the Secretary, General Hospital, Nottingham.

NEWARK GENERAL HOSPITAL. Nottingham No. 1 HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (medical) required for above Hospital, situated on Great North-road approximately 20 miles from Nottingham. Post offers good experience. The Consultant staff attending Newark Hospital are on 1 or more of the Nottingham Hospitals. During next few months a flat will be available as married quarters, but in meantime single accommodation can be provided. Salary £775–£50–£1075. Duties to commence as soon as possible.

Applications, giving names of 3 referees, should be sent to Group Secretary, Nottingham No. 1 Hospital Management Committee, General Hospital, Nottingham.

OXFORD REGIONAL HOSPITAL BOARD. Registrar (whole-time), non-resident, in Ophthalmology to the hospitals and clinics of the Aylesbury/High Wycombe area. The appointment will be for 1 year and eligible for extension to a second year.

Applications, on forms obtainable from the Secretary, Registrars Committee, 43, Banbury-road, Oxford, to reach him by 16th March.

OXFORD REGIONAL HOSPITAL BOARD. Registrar in Accident and Orthopædic Surgery to the hospitals of Northampton Hospital Management Committee. The duties will mainly be at Northampton General Hospital, but will include work at the Mansfield Orthopædic Hospital. The appointment will be for 1 year and eligible for a second year. The successful candidate may live in or near the Northampton General Hospital.

Applications, on forms obtainable from the Secretary, Registrars Committee, 43, Banbury-road, Oxford, should reach him by 16th March.

PAISLEY. ROYAL ALEXANDRA INFIRMARY. House SURGEON (pre-registration) required immediately for general surgery.

Applications to Group Medical Superintendent.

PAISLEY. ROYAL ALEXANDRA INFIRMARY. House SURGEON (pre-registration) required immediately for Orthopædic and Fracture Unit.

Applications to Group Medical Superintendent.

PAISLEY. ROYAL ALEXANDRA INFIRMARY. Junior HOSPITAL MEDICAL OFFICER required for Casualty Department. Applicants must be fully registered for 1 year.

Applications to Group Medical Superintendent.

PAISLEY. I.D. HOSPITAL, Hawkhead-road. House PHYSICIAN (pre-registration) required immediately.

Applications to Group Medical Superintendent, Royal Alexandra Infirmary, Paisley.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL.

SENIOR HOUSE OFFICER in General Medicine, vacant 1st July, 1957.

SENIOR HOUSE OFFICER in Anæsthetics, vacancies 1st April, 1st May, 1957. Recognised for the D.A. and F.F.A.R.C.S. Appointments will be for a period of 12 months.

Applications, stating age, nationality, qualifications, and experience, together with the names and addresses of 3 referees, to be sent to—

F. HALL, Deputy Group Secretary, Plymouth,
South Devon and East Cornwall General Hospital Group,
7, Nelson-gardens, Stoke, Plymouth.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

(1) **Royal Portsmouth Hospital**

HOUSE SURGEON. 70 Beds. Pre-registration post. Vacant now.

(2) **Queen Alexandra Hospital** (87 surgical beds)

SENIOR HOUSE SURGEON, vacant 1st April, 1957.

(3) **Queen Alexandra Hospital** (78 medical beds)

HOUSE PHYSICIAN (pre-registration), vacant 15th March, 1957.

Applications, stating age, experience and qualifications, together with the names of 2 referees, should be forwarded as soon as possible to E. H. HURST.

St. Mary's Hospital, Milton-road, Portsmouth.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment, vacant now, of Locum REGISTRAR in the Chest Services of the Group for duties at the Portsmouth Chest Clinic and tuberculosis and non-tuberculosis beds at the Infectious Diseases Hospital and Saint Mary's Hospital, Portsmouth, including experience with a major Thoracic Surgery Unit.

Applications should be sent to the Group Secretary, Saint Mary's Hospital, Milton, Portsmouth.

REDHILL. EAST SURREY HOSPITAL, Shrewsbury-road, REDHILL, SURREY. SENIOR HOUSE OFFICER (Male), mainly surgical. Post vacant April.

Apply to the Hospital Secretary.

ROCHFORD. GENERAL HOSPITAL. Applications are invited for the appointment of a SENIOR HOUSE OFFICER (clinical pathology). Post tenable for 1 year and recognised for Diploma in Pathology. Previous experience in pathology not essential but applicants must have good clinical experience. Post vacant mid-March.

Applications, with copies of 2 recent testimonials, to be sent to the undersigned not later than 11th March, 1957.

J. C. FIELD, Secretary.

General Hospital, Rochford, Essex.

ROCHFORD, ESSEX. GENERAL HOSPITAL. Locum SENIOR HOUSE OFFICER (general medicine) required at above Hospital from 11th to 22nd March, 1957.

Applications to the undersigned as soon as possible.

J. C. FIELD, Secretary.

General Hospital, Rochford, Essex.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) RESIDENT HOUSE SURGEON required from 28th March, 1957, in the General Surgical Unit. Recognised for F.R.C.S. Open to either pre-registration applicants or to fully qualified practitioners. This very active Unit of a total of approximately 180 Beds affords ample opportunities for candidates to obtain first-class tuition and experience. The candidate appointed will be attached to a unit of approximately 60 Beds.

Applications should be forwarded immediately to the Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (99 Beds.) RESIDENT HOUSE SURGEON (Male) required immediately. (Not pre-registration appointment.)

Applications should be forwarded to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

READING COMBINED HOSPITALS. Area Department OF OBSTETRICS AND GYNÆCOLOGY. (100 Beds.) Applications are invited from registered medical practitioners, Male and Female, for the resident appointment of GYNÆCOLOGICAL HOUSE SURGEON at the Royal Berkshire Hospital, Reading. Vacant 1st April and tenable for 6 months. Post recognised for M.R.C.O.G.

Write, stating age and qualifications with dates, nationality, and present post, with copy of 1 recent testimonial, to Secretary.

SALISBURY GENERAL HOSPITAL. Applications are invited for the appointment of RESIDENT HOUSE SURGEON/OBSTETRIC AND GYNÆCOLOGICAL HOUSE SURGEON (recognised by R.C.O.G.) to run consecutively in this order from 2nd May, 1957, for a period of 6 months in each post. The posts are open to pre-registration candidates.

Apply, giving names and addresses of 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SCOTLAND. NORTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the post of SENIOR REGISTRAR in Obstetrics and Gynæcology—main duties in Aberdeen General and Aberdeen Special Hospitals. Candidates should have experience in their specialty and preferably hold an appropriate higher qualification.

Applications, giving 2 names for reference, should be submitted by 22nd March, 1957, to the Secretary, 1, Albyn-place, Aberdeen, from whom further particulars may be obtained.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time post of REGISTRAR at the County Hospital, Stornoway (Tuberculosis and Infectious Diseases). A house is available for a married officer.

Further particulars and forms of application are available from the undersigned, with whom applications should be lodged by 16th March, 1957. A. M. FRASER, M.D.,

Secretary and Administrative Medical Officer.

Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time post of SENIOR REGISTRAR in Anæsthetics. Duties mainly at the Royal Northern Infirmary and Raigmore Hospital, Inverness.

Forms of application and further particulars may be obtained from the undersigned, with whom applications should be lodged by Saturday, 16th March, 1957.

A. M. FRASER, M.D.,

Secretary and Administrative Medical Officer.

Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens ANÆSTHETIST (Senior Registrar grade) required for 3½ months from 1st June, 1957. Main duties at the Royal Northern Infirmary and Raigmore Hospital, Inverness.

Applications, on forms obtainable from the undersigned, should be submitted as soon as possible.

A. M. FRASER, M.D.,

Secretary and Administrative Medical Officer.

Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. REGISTRAR in Dermatology at the Royal Infirmary of Edinburgh.

Apply, giving particulars of age, qualifications and previous experience, together with the names of 2 referees, to the Secretary, South-Eastern Regional Hospital Board, 11, Drumsheugh-gardens, Edinburgh, 3, by 23rd March, 1957.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. REGISTRAR in Medicine in the Royal Infirmary of Edinburgh.

Apply, giving particulars of age, qualifications and previous experience, together with the names of 2 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 23rd March, 1957.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. REGISTRAR in the Medical Neurology Unit at the Northern General Hospital, from 1st April, 1957. This Unit is associated with the University of Edinburgh for purposes of undergraduate and postgraduate teaching and research.

Apply, giving particulars of age, previous experience and qualifications, together with the names of 2 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 23rd March, 1957.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. REGISTRAR in E.N.T. Surgery at the Royal Infirmary of Edinburgh.

Apply, giving particulars of age, qualifications and previous experience, together with the names of 2 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 23rd March, 1957.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments, which will be for 1 year in the first instance :—

REGISTRAR in Surgery based at the Royal Alexandra Infirmary, Paisley.

REGISTRAR in Surgery based at the Royal Infirmary, Greenock.

REGISTRAR in E.N.T. Surgery based at the Royal Infirmary, Glasgow, for duties at Law Hospital, Carluke.

REGISTRAR in E.N.T. Surgery based at the Royal Infirmary, Glasgow.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, by 16th March, 1957.

SHEFFIELD, 5. CITY GENERAL HOSPITAL. Locum HOUSE SURGEON (general surgery) required for the period 28th April–14th July, 1957.

Apply, giving full details, to the Group Secretary, Nether Edge Hospital, Sheffield, 11.

SHEFFIELD. KING EDWARD VII ORTHOPÆDIC HOSPITAL, Rivelin Valley-road, SHEFFIELD. (144 Beds.) SHEFFIELD NO. 3 HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER (resident) at the above Hospital. The post, which is normally held for 1 year in the first instance, will be subject to the terms and conditions of service for hospital medical staff. Salary £745 p.a. Emolument charge £150 p.a.

Applications, with names of 2 referees, to Group Secretary, Sheffield No. 3 Hospital Management Committee, Lodge Moor Hospital, Sheffield, 10.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Applications invited for the following posts :—

(*a*) NON-RESIDENT REGISTRAR or SENIOR HOUSE OFFICER in General Medicine at the Royal Infirmary. Grade according to qualifications and experience. Post vacant 25th March, 1957.

Closing date for applications 6th March.

(*b*) 2 SURGICAL REGISTRARS at the Royal Infirmary and the Children's Hospital. Both posts are vacant on 15th April. The successful candidates will work on a rotation basis between the Royal Infirmary and the Children's Hospital. It is intended, if possible, that the holders of the posts will spend equal periods in the Orthopædic Department and on each of 2 surgical firms, at the Royal Infirmary, and for a period at the Children's Hospital.

Closing date for applications 13th March.

Applications for the above posts should state age, qualifications and experience, give the names of 3 referees, and be sent to the Chief Administrative Officer, The United Sheffield Hospitals, West-street, Sheffield, 1.

SHREWSBURY. CROSS HOUSES HOSPITAL. (34 maternity beds.) OBSTETRIC HOUSE SURGEON (pre-registration post), vacant 5th April, 1957.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY AND COPTHORNE HOSPITAL. (500 Beds.) RESIDENT ANÆSTHETIST (Senior House Officer). Post recognised for F.F.A.R.C.S. Registrar also employed. Vacant immediately.

Applications and copy testimonials to Group Secretary, Shrewsbury Hospital Group Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY/COPTHORNE HOSPITAL. (500 Beds.) HOUSE SURGEON, vacant 1st March, 1957. Pre-registration candidates eligible. Recognised for the F.R.C.S.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY. (216 Beds.) HOUSE PHYSICIAN (pre-registration or otherwise), vacant 24th April, 1957.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. REGISTRAR required for busy Casualty Department, resident or non-resident. Experience provided in orthopædic and hand surgery.

Forms of application from, and returnable to, Secretary, Windsor Hospital Management Committee, Alma-road, Windsor, by 10th March.

STIRLING AND CLACKMANNAN HOSPITALS BOARD OF MANAGEMENT. There will be a vacancy on 15th March, 1957, for a SENIOR HOUSE OFFICER in Surgery at Clackmannan County Hospital.

Applications, with 2 names for reference, should be sent to the Group Medical Superintendent, Stirling Royal Infirmary, from whom further particulars can be obtained.

SOUTHAMPTON CHEST HOSPITAL. (261 Beds.) SENIOR HOUSE OFFICER required in March, to be responsible for Infectious Diseases Unit. The duties are such as to suit a candidate reading for higher examinations. The Unit is sited at a Hospital possessing up-to-date Tuberculosis and Thoracic Surgical Units, whilst the Southampton Group of hospitals as a whole affords excellent opportunities for study and experience in all branches of medicine.

Applications, together with copies of recent testimonials, should be forwarded as soon as possible to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON GENERAL HOSPITAL. South West METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of Whole-time SURGICAL REGISTRAR to the above Hospital vacant mid-June. Post will normally be tenable for 2 years, but subject to review at the end of the first year. Candidates may visit the Hospital, by arrangement, if they so desire.

Forms of application may be obtained from the undersigned to whom they should be returned not later than 13th March, 1957.

FRANK JENNINGS, Group Secretary,
Southampton Group Hospital Management Committee.
Bullar-street, Southampton.

SOUTHAMPTON GROUP OF HOSPITALS. South West METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of Whole-time ANÆSTHETIC REGISTRAR to the above Group for work in the General and Special Units, vacant in May. Special facilities for working for Primary or Final F.F.A.R.C.S.

Forms of application may be obtained from the undersigned to whom they should be returned not later than 13th March, 1957.

FRANK JENNINGS, Group Secretary,
Southampton Group Hospital Management Committee.
Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (278 Beds.) RESIDENT HOUSE SURGEON required. Pre-registration candidates eligible.

Applications, with copies of recent testimonials, should be forwarded to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHEND-ON-SEA HOSPITAL. Temporary Orthopædic REGISTRAR (full-time) required for duties at hospitals in the Southend-on-Sea Group. Post vacant 14th March, 1957.

Applications, accompanied by copies of recent testimonials, to be sent to the undersigned as soon as possible.

J. C. FIELD, Secretary.

ST. HELENS AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. ST. HELENS HOSPITAL. (196 Beds.) Applications are invited for the appointment of RESIDENT HOUSE SURGEON (Senior House Officer grade), which becomes vacant from 1st March, 1957.

Applications, stating age, qualifications, and experience, and giving 2 names for reference, should be forwarded to—

N. RICHARDS, Group Secretary.
Whiston Hospital, Prescot, Lancs.

ST. HELENS AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. ECCLESTON HALL HOSPITAL (75 Beds), DELPH LANE HOSPITAL, WHISTON (34 Beds). Applications are invited for the post of SENIOR HOUSE OFFICER at the above hospitals. The person appointed will work under the supervision of the Consultant Chest Physician for the Group. The work comprises all types of tuberculosis and includes chest clinic work. Good residential accommodation for a single person, Male or Female, is available. The post may be non-resident, subject to residence within reasonable distance from the hospitals.

Applications to be forwarded to N. RICHARDS, Group Secretary, Whiston Hospital, Prescot.

SUTTON. BELMONT HOSPITAL. St. Ebba's and BELMONT GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for appointment as SENIOR REGISTRAR at above Hospital, which is principally concerned with the treatment of neuroses and the early psychoses. There are ample opportunities for research and the Hospital takes an active part in teaching in association with teaching hospitals. Candidates should possess the D.P.M. and may visit the Hospital by appointment with the Physician-Superintendent.

Application forms may be obtained from the Group Secretary, Group Office, Belmont Hospital, Brighton-road, Sutton, Surrey, and completed forms (5 copies) should be returned to him within 2 weeks of the appearance of this advertisement.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as a Whole-time REGISTRAR in Psychiatry to fill a vacancy in the approved trainee establishment in the Darenth and Stone Group of hospitals for duty at Darenth Park, Dartford (for the training of mental defectives), available on 1st April, 1957. The Hospital is situate 15 miles from London and facilities are made available for postgraduate study. Students from certain teaching hospitals attend for demonstrations. Previous experience in general medicine is desirable. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications, and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 16th March, 1957.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. CANTERBURY, ISLE OF THANET, AND SOUTH-EAST KENT GROUPS OF HOSPITALS. Applications are invited for an appointment as REGISTRAR in Orthopædic Surgery to the Canterbury and South-East Kent Groups. A similar appointment to the Canterbury and Isle of Thanet Groups has already been made, and duties will rotate annually between the 2 appointments, which offer experience in traumatic work and in general orthopædic surgery, including long-stay cases. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Applications, giving particulars of age, qualifications, and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, London, W.1, not later than 16th March, 1957.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of SENIOR REGISTRAR in Chest Medicine to the Tuberculosis Early Treatment and Assessment Unit at Joyce Green Hospital in the Dartford Group available on 17th April. The duties will be both inpatient and in chest clinics associated with the unit in both the Dartford and Sidcup and Swanley Groups of hospitals. Candidates must have had wide experience in general medicine and in the diagnosis and treatment of pulmonary tuberculosis. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications, and experience with relevant dates, together with the names and addresses of 3 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 16th March, 1957.

STAFFORD. STAFFORDSHIRE GENERAL INFIRMARY. (175 Beds. Recovery Unit 32 Beds.) SENIOR HOUSE OFFICER (obstetrics and gynæcology), resident post.

Applications to Group Secretary, Stafford Hospital Management Committee, 13, Foregate-street, Stafford.

STOCKPORT INFIRMARY. Stockport and Buxton HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (non-resident Casualty Officer). Hours of duty: 8.30 A.M.–4.30 P.M. Monday–Friday; 8.30 A.M.–12 noon Saturday. The post is recognised under F.R.C.S. regulations and would suit a candidate wishing to study for higher qualifications.

Applications, stating age, qualifications and experience, together with copies of 2 testimonials, to be addressed to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport, Cheshire.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. HOUSE OFFICER (general surgery) required. Pre-registration post. Hospital recognised for F.R.C.S.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

SUNDERLAND AREA HOSPITAL MANAGEMENT COMMITTEE. RESIDENT ANÆSTHETIST is required for duties at hospitals in the above Group. Senior House Officer grade. Post vacant immediately. The post offers good practical experience under the supervision of the visiting Anæsthetists. The hospitals are recognised for the F.F.A.R.C.S. and the D.A. In addition every opportunity is given to attend lectures at the neighbouring University 12 miles away.

Apply to the Group Secretary, Sunderland Area Hospital Management Committee, General Hospital, Sunderland, naming 2 referees.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. Locum SENIOR HOUSE OFFICER (anæsthetics) required 10th–23rd March.

Applications, with copies of 2 testimonials, to Secretary.

TAUNTON AND SOMERSET HOSPITAL. Applications are invited for HOUSE OFFICER (general surgery). Post vacant now. Recognised for pre-registration candidates and F.R.C.S.

Applications, stating age, nationality, and qualifications, together with the names of 2 referees, should be forwarded to the Group Secretary, Taunton Hospital Management Committee, Musgrove Park Hospital, Taunton, Somerset.

TORQUAY. TORBAY HOSPITAL. Senior Resident HOUSE OFFICER (medicine) required mid-April, 1957. There is a complement of 6 Resident House Officers.

Applications, stating qualifications, age, nationality, with copy testimonials (quoting ref. F.955/78), to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

TREDEGAR, MONMOUTHSHIRE GENERAL HOSPITAL. (20 miles from Newport and 24 from teaching hospital at Cardiff; 6 miles from Vale of Usk.) Applications are invited for post of HOUSE SURGEON. Preference given to pre-registration candidates. Surgical unit of 50 Beds and 6 orthopædic beds under daily supervision of Consultant Surgeon and visiting supervision of Orthopædic Surgeon. Busy Outpatient, Casualty and Radiological Departments. Married quarters.

Apply to Group Secretary, address as above.

UXBRIDGE CHEST CLINIC, High-street, Uxbridge, MIDDLESEX. MEDICAL REGISTRAR required for duties including clinical work, also supervision of patients at Hillingdon Hospital (30 Beds). Candidates require experience in general medicine and some experience in treatment of tuberculosis and diseases of chest. Further details from Physician-in-Charge. Clinic may be visited by direct appointment.

Application forms obtainable from, and returnable to, Group Secretary, Uxbridge Group Hospital Management Committee, The Furze, Pield Heath-road, Hillingdon, Middlesex, by 12th March.

WARLINGHAM PARK HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for appointment of REGISTRAR. Opportunity will be given for experience in all branches of psychiatry, psycho-neurosis, industrial psychiatry, delinquency and child guidance. Candidates may visit the Hospital by arrangement with the Medical Superintendent.

Application forms obtainable from Group Secretary, Warlingham Park Hospital, Warlingham, Surrey, should be returned within 14 days from the date of this advertisement.

WATFORD PEACE MEMORIAL HOSPITAL AND SHRODELLS HOSPITAL, WATFORD. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. MEDICAL REGISTRAR required at above Hospitals which may be visited by direct appointment.

Application forms obtainable from, and returnable to, Group Secretary, West Herts Group Hospital Management Committee, 9, Rickmansworth-road, Watford, Herts, by not later than 10 days after appearance of this advertisement.

WATFORD CHEST CLINIC, PEACE MEMORIAL HOSPITAL, WATFORD. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications invited for the post of REGISTRAR at the above Clinic and associated Beds (tuberculosis 47, chest medicine 16) at Shrodells and Holywell Hospitals. This is a new Chest Clinic. A car is necessary—usual allowances paid. Experience in general medicine and tuberculosis work including refill techniques is essential. This chest unit is closely associated with Harefield Hospital, the Physician-in-charge being on the Consultant staff of this Hospital. Applicants invited to visit the Clinic and should contact the Physician-in-charge.

Application form obtainable from, and returnable to, the Secretary, West Herts Group Hospital Management Committee, 9, Rickmansworth-road, Watford, Herts, by not later than 10 days after the appearance of this advertisement.

WATFORD. SHRODELLS HOSPITAL. Applications are invited for the post of HOUSE OFFICER (Senior House Officer grade) to the Pædiatric Unit of 38 Beds, to take up duty about 1st March. Post recognised for the D.C.H.

Applications, together with copies of 2 recent testimonials, should reach the Medical Officer-in-Charge as soon as possible.

WARRINGTON GENERAL HOSPITAL. (344 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST (Male or Female). Graded as Senior House Officer. The Hospital is recognised for the D.A. examination. Salary is £745 p.a., less a deduction of £150 p.a. for residential emoluments.

Applications, stating qualifications and experience, should be sent to— HENRY L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

WELSH REGIONAL HOSPITAL BOARD.

REGISTRAR in Psychiatry, based St. Cadoc's Hospital, Caerleon, Mon. (470 Beds). Full range of modern psychiatric treatments and number of associated general hospital outpatient clinics. Resident.

REGISTRAR (infectious diseases) based Hill House Isolation Hospital, Swansea (130 Beds), to serve Glantawe Hospital Management Committee. Resident.

Subject review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WHITEHAVEN HOSPITAL, Cumberland (119 Beds, Pre-registration post.) HOUSE PHYSICIAN (first, second or Senior House Officer post), vacant end of March.

Detailed applications, with dates and names of 2 referees, to Group Secretary.

WIGAN (near). WRIGHTINGTON HOSPITAL. Senior HOUSE OFFICER required (resident or non-resident). 74 Beds for pulmonary tuberculosis. 267 Beds for orthopædic tuberculosis. Salary and board charges in accordance with national scale.

Apply to Secretary with 2 references.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. WINCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR in Medicine (Registrar grade) required at the above Hospital, vacant 1st June, 1957. Accommodation available for married candidate.

Forms of application obtainable from the Group Secretary, Royal Hampshire County Hospital, must be completed and returned not later than 18th March.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. (315 Beds.) HOUSE SURGEON (post recognised by Royal College of Surgeons) required for general surgery with some E.N.T. duties. Approved pre-registration post. Vacant immediately.

Applications, with copies of 2 testimonials, to the Group Secretary.

WINDSOR. KING EDWARD VII HOSPITAL. Casualty OFFICER required (Senior House Officer grade). Department forms part of Accident Service of Windsor Group. Duties include House Surgeon to E.N.T. and Eye Departments. Previous experience in treatment of acute injuries desirable.

Applications, stating age, qualifications with dates, nationality, with copies of recent testimonials, to Secretary.

WORKINGTON INFIRMARY, Cumberland. (119 Beds. Pre-registration post.) HOUSE PHYSICIAN (first, second, or Senior House Officer post), vacant end of March.

Detailed applications with dates, and names of 2 referees, to Group Secretary.

WORTHING HOSPITAL, Lyndhurst-road, Worthing. (Acute General—210 Beds.) The vacancy of HOUSE SURGEON will occur on 1st April, 1957.

Applications from either registered medical practitioners or pre-registration candidates, stating age, qualifications, experience, nationality, and enclosing copies of 2 recent testimonials, to be forwarded to the Hospital Secretary as soon as possible.

A. V. OAKTON, Group Secretary.
Worthing Group Hospital Management Committee.

WREXHAM. MAELOR GENERAL HOSPITAL. (591 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital, to commence duties as soon as possible. The appointment is recognised for the Diploma of F.R.C.S. (Eng. and Edin.) and is a pre-registration post.

Applications, stating age, nationality, qualifications and experience, with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

YORK. CITY HOSPITAL. (General—256 Beds, with full Consultant staff.) HOUSE OFFICER (pre-registration or registered) or Locum SENIOR HOUSE OFFICER in General Surgery required immediately.

Applications, stating age, qualifications, experience, names of 2 referees, to Group Secretary, Bootham Park, York.

NORTHERN IRELAND HOSPITALS AUTHORITY. Applications are invited for a whole-time post as REGISTRAR in General Surgery at hospitals managed by the Downpatrick Hospital Management Committee. The terms and conditions will be in accordance with the application of the Spens report to Northern Ireland.

Applications to be made on a form obtainable (with further particulars) from the Secretary, Northern Ireland Hospitals Authority, 44–46, Queen-street, Belfast, and to be returned not later than 16th March, 1957.

B.W.I. UNIVERSITY COLLEGE HOSPITAL OF THE WEST INDIES. Applications are invited for 2 posts of REGISTRAR or SENIOR REGISTRAR in Medicine at this Teaching Hospital which is in special relationship with the University of London. The successful candidates will be required to commence duties in May and October, 1957. 1 of the appointments is for 18 months and the other for 1 year, and the salaries will be within the scales £900–£100–£1100 : £1200–£100–£1500 p.a. depending on previous experiences and qualifications. If available, an unfurnished flat will be provided at a rental of 5% of salary, otherwise, a living-out allowance of up to £200 p.a. for a married person, £150 for a single person will be granted. Return passages from and to the country of recruitment are provided for the appointee but not for wife and family.

Further information may be obtained from the Hospital Manager and Secretary, University College Hospital of the West Indies, Mona P.O., Jamaica, B.W.I., to whom applications, stating age, nationality, qualifications, and experience, together with the names and addresses of 3 referees, should be sent not later than 22nd March, 1957.

CANADA. REDDY MEMORIAL HOSPITAL, Tupper-street, WESTMOUNT, MONTREAL. RESIDENT in Pathology required at earliest possible date. 2 or more years experience desirable with emphasis on tissue pathology. Salary $2700–$3600 p.a. depending on experience and qualifications. Appointment initially for 1 year, but could be extended by mutual agreement.

Apply, giving full details and names of 2 referees, to Executive Director.

IOWA, U.S.A. IOWA METHODIST HOSPITAL, DES MOINES, IOWA. 400-Bed General Community Hospital fully approved for resident training in all specialties. Also have opportunities for 1-year INTERNS. U.S.A. citizenship and licensure not required. Stipend $175 per month, plus full maintenance for Physician ; apartment available for family.

Apply Administrator.

IBADAN, NIGERIA. UNIVERSITY COLLEGE HOSPITAL. DEPARTMENT OF SURGERY.

1 SENIOR REGISTRAR (1 of 2 at present).
1 REGISTRAR (1 of 5).
1 SENIOR REGISTRAR or REGISTRAR (E.N.T.).

The Board of Management invite applications from medical practitioners with the requisite post-graduate experience and qualifications for the above posts in the almost completed teaching hospital.

The salaries offered for the posts are :

Senior Registrar : £1428 p.a., rising by 3 annual increments to £1596 p.a., plus an inducement allowance payable to an expatriate doctor of £300 p.a.

Registrar : £1164 p.a. for the first year, rising to £1212 p.a. for the second year, plus an inducement allowance payable to an expatriate doctor of £270 p.a.

Successful candidates will be asked to assume duty about 1st May, 1957.

The Senior Registrar must hold the F.R.C.S and have had sufficient experience to enable him to deputise for Consultant : there is plenty of scope for operative experience. Senior Registrars will probably be asked to supervise the Casualty Department for 6 months of this time. This would be in conjunction with the Traumatic inpatient work which is very heavy.

The Registrar will work in a team consisting of a Consultant, with or without Senior Registrar and appropriate House Officers. There is ample scope for experience in general and traumatic surgery. The Registrar will also help with the supervising of casualty in rotation. It is possible to arrange with the Anatomy and Physiology Department of University College for work for the Primary Fellowship.

The Senior Registrar or Registrar (E.N.T.) should hold an F.R.C.S. and be sufficiently experienced to take charge in the absence, on leave, of the Senior Lecturer.

The appointment will be initially for 1 tour of 12 months and will be renewable, by mutual agreement, for a further tour of 12 months. On satisfactory completion of the agreement a gratuity of £37 10s. will be paid for each completed term of 3 months service. An outfit allowance of £60 is payable on first appointment. Partly furnished quarters are provided at a rental of 8½% of salary, excluding inducement allowance, and the officer appointed will be eligible for 7 days leave on full pay for each completed month of service in Nigeria. Free first-class passages are provided for expatriate doctors and their wives on first appointment and on completion of their agreement. Free first-class passages to Nigeria, will in certain circumstances, be provided for non-expatriate doctors. Free first-class passages will be provided on vacation leave. Successful candidates will be eligible for children's allowance in accordance with current regulations. Arrangments can be made to enable doctors to continue their National Health Service superannuation scheme contributions and details of the revised salary and gratuity payable in such cases will accompany application forms.

Applications should be submitted not later than 16th March, 1957, on the appropriate forms which will be forwarded together with additional information, on receipt of an addressed foolscap envelope by the Adviser on Staff Recruitment, London Office, University College Hospital, Ibadan, 57, Catherine-place, Palace-street, London, S.W.1.

IBADAN, NIGERIA. UNIVERSITY COLLEGE HOSPITAL. DEPARTMENT OF MEDICINE. SENIOR REGISTRAR, 2 REGISTRARS (or SENIOR HOUSE OFFICERS). The Board of Management invite applications from registered medical practitioners for the above appointments in the new teaching hospital of 500 beds, which will open for the reception of patients within the next two months. The building is on the most modern lines. The Department of Medicine contains 120 Beds; there is also a well-equipped outpatients clinic. There is great variety in the clinical conditions encountered and much room for original work, the departmental facilities for which are excellent. Candidates insufficiently experienced for Registrar, may be offered an engagement in the grading of Senior House Officer.

The salaries offered for the posts are:
Senior Registrar: First year £1428 p.a.; second year £1482 p.a.; third year £1542 p.a.; fourth year £1596 p.a.
Registrar: First year £1164 p.a.; second year £1212 p.a.
Senior House Officer: £1116 p.a.

In addition, an inducement allowance is payable to an expatriate doctor of £270 p.a. on salary less than £1285 p.a. or £300 where the salary exceeds £1285 p.a.

The appointment will be initially for 1 tour of 12 months and will be renewable by mutual agreement for a further tour of 12 months. On satisfactory completion of the agreement a gratuity of £37 10s. will be paid for each completed term of 3 months service. An outfit allowance of £60 is payable on first appointment. Partly furnished quarters are provided at a rental of 8½% of salary excluding inducement allowance, and an expatriate officer appointed will be eligible for 7 days leave on full pay for each completed month of service in Nigeria. Free first-class passages are provided for expatriate doctors and their wives on first appointment and on completion of their agreement. Free first-class passages to Nigeria will, in certain circumstances, be provided for non-expatriate doctors. Leave privileges for Nigerian Registrars follow closely those granted to expatriate doctors while leave for Senior House Officers is on a lower scale. Arrangements can be made to enable doctors to continue their National Health Service superannuation scheme contributions and details of the revised salary and gratuity payable in such cases will accompany application forms.

Applications should be submitted not later than 16th March, 1957, on the appropriate forms which will be forwarded, together with additional information, on receipt of foolscap envelope by the Adviser on Staff Recruitment, London Office, University College Hospital, Ibadan, 57, Catherine-place, Palace-street, London, S.W.1.

Public Appointments

CROYDON. COUNTY BOROUGH OF CROYDON. ASSISTANT MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER. Applications are invited for this established appointment from registered medical practitioners having at least 3 years experience after qualification, for duties mainly in the School Health and Maternity and Child Welfare Services. Possession of the D.P.H. or D.C.H. will be an advantage. Salary within the scale £1050–£50–£1200–£55–£1475 p.a.

Application forms (from the Medical Officer of Health, 45, Wellesley-road, Croydon), must be returned to him not later than 23rd March, 1957. E. TABERNER, Town Clerk.

GOVERNMENT OF THE FEDERATION OF RHODESIA AND NYASALAND. MINISTRY OF HEALTH. Vacancies: GOVERNMENT MEDICAL OFFICERS (Male). As a result of continued expansion in the Medical Services of the Federation further vacancies exist for Government Medical Officers. These are essentially general duty posts and applicants must have completed 1 years experience since qualifying. Minimum commencing emoluments, including allowances in lieu of private practice vary between £1450 and £1650 p.a. according to experience. The maximum basic salary on this grade is £1850 but opportunities exist for transfer to centres with private practice benefits or promotion to higher grades.

Application forms and further details from the Secretary (R), Rhodesia House, 429, Strand, London, W.C.2. Closing date 30th March.

HER MAJESTY'S OVERSEAS CIVIL SERVICE. Applications invited from doctors with qualifications registrable in United Kingdom for following posts in Trinidad. D.P.H. or equivalent qualification required, and in addition—for (*a*) 3 years public health experience following diploma; for (*b*) 3 years post-registration experience, of which 2 in V.D. work.

(*a*) Public Health Department—MEDICAL OFFICER (Grade "A") for duties usually required of Medical Officers of Health including public health administration, environmental sanitation, maternity and child welfare services, school health, communicable disease control, housing, &c., and the implementation of Ordinance and Laws relating to public health. Salary scale £1500–£1600 a year plus £200 in lieu of consulting practice.

(*b*) Venereal Disease Division—MEDICAL OFFICER (Grade "B") to undertake and supervise diagnostic and treatment measures in various Venereal Disease and Yaws treatment centres; to supervise work of Junior Medical Officers, teach control and treatment measures to junior medical and nursing staff and coöperate with Public Health Officers in effecting such control. Salary scale £1400–£1500 a year.

Appointment can be on permanent basis with pension (non-contributory); or on agreement or from National Health Service with retention of superannuation rights (up to 6 years) and gratuity (taxable) of 20% of aggregate salary on completion of engagement. Only permanent officers are members of Her Majesty's Overseas Civil Service. Government quarters, if available, at low rental or allowance in lieu. Free passages for Officer, wife, and children under 18 years, not exceeding 5 persons in all and up to 3 persons on leave. Educational facilities available.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD. 117/38/020).

HER MAJESTY'S OVERSEAS CIVIL SERVICE. Somaliland Protectorate.

Male MEDICAL OFFICER required for general medical duties, including simple surgery and, if necessary, training of dressers.

Lady MEDICAL OFFICER (single) required for general medical duties, with special reference to diseases of women and children. Should be prepared to run maternity and child welfare clinics and assist in training of Somali staff.

Candidates must possess qualifications registrable in United Kingdom. Salary scale from £1116 to £1836 a year, plus temporary (non-pensionable) cost-of-living allowance of 10% of salary subject to maximum of £162 a year. Commencing salary determined by qualifications and experience. Pension earned at rate of 1/600th of final pensionable emoluments for each completed month of service. Furnished quarters provided at low rental. Free passages in both directions for Officer, wife, and up to 4 children under 18 years. No income-tax. Tour of service 15–21 months, after which generous home leave granted. Local leave also granted.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD. 117/5/01).

GOVERNMENT OF MAURITIUS. Senior Medical OFFICER OF HEALTH required for Public Health Administration in 1 or more districts, particularly control of building, hygienic condition of premises, factories, shops, restaurants, warehouses, &c., control of epidemic diseases. Rodent control, Port Health, Night Soil and scavenging and all matters connected with environmental hygiene and health education. Candidates must possess qualifications registrable in United Kingdom and D.P.H. Appointment on contract for 3 years with gratuity (taxable) of £50 a quarter payable on satisfactory completion of contract. Salary scale £1066 10s.–£1561 10s. a year. Cost-of-living allowance also payable of 9% of basic salary. An officer not allocated Government quarters may be reimbursed difference between approved rent paid for a furnished private house (subject to a maximum of £22 10s. a month) and the 10% of salary normally paid for a Government house. An officer in hotel or boarding house regarded as paying rent for first 21 days at one half and thereafter one quarter of board and lodging charge for himself and family. Income-tax at local rates. Free passages.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD.117/52/021).

MID-WARWICKSHIRE JOINT SANITARY COMMITTEE AND WARWICKSHIRE COUNTY COUNCIL. DEPUTY MEDICAL OFFICER OF HEALTH AND ASSISTANT COUNTY MEDICAL OFFICER OF HEALTH. Applications are invited from duly qualified medical practitioners for the post of Deputy Medical Officer of Health to the Mid-Warwickshire Joint Sanitary Committee and Assistant County Medical Officer of Health to the Warwickshire County Council which posts together constitute a whole-time appointment, the time being allocated equally between the Mid-Warwickshire Joint Sanitary Committee and the County Council. The officer appointed must hold the Diploma in Public Health. The inclusive salary will be at the rate of £1412 18s. 4d. p.a., rising to a maximum of £1813 10s. 10d. p.a. by the following annual increments: 3 of £58 15s., 1 of £61 17s. 6d., 1 of £59 7s. 6d., and 3 of £34 7s. 6d., for convenience the increments of the 2 appointments have been added together. In addition, travelling and subsistence allowances will be payable in accordance with the scales adopted by the County Council. The appointment will be made by the Mid-Warwickshire Joint Sanitary Committee, and the successful applicant will subsequently be appointed by the Warwickshire County Council as an Assistant County Medical Officer of Health for the administrative County of Warwick with duties in connection with the health and school medical services of the County Council. The Joint Sanitary Committee is comprised of the following local authorities—the Boroughs of Royal Leamington Spa and Warwick, the Urban District of Kenilworth, the Rural Districts of Southam and Warwick. The appointment of Deputy Medical Officer of Health to the Joint Sanitary Committee is subject to the Sanitary Officers (Outside London) Regulations, 1935 and 1951. Temporary accommodation in a Council house in Leamington Spa is available to the successful applicant for a reasonable period to give him the opportunity of securing alternative accommodation.

Conditions of appointment may be obtained from the undersigned by whom applications must be received not later than 30th March, 1957. T. W. H. WATKISS,
Clerk of the Mid-Warwickshire Joint Sanitary Committee.
23, Waterloo-place, Leamington Spa, March, 1957.

WORCESTERSHIRE COUNTY COUNCIL. Assistant COUNTY MEDICAL OFFICER. Applications invited from registered medical practitioners (Men or Women) for this appointment. The duties will chiefly concern School Health and Child Welfare Services. D.C.H. or D.P.H. an advantage. Salary, travelling and subsistence allowances on national scale. Additional £200 p.a. paid for occasional duties during the absence of the Medical Officer of Health for Halesowen and Stourbridge Boroughs and Medical Superintendent of the Hayley Green Isolation Hospital.

Application forms from County Medical Officer, County Buildings, Worcester. (S.20.)

LONDON COUNTY COUNCIL. Applications are invited from medical practitioners practising under National Health Service for appointment as VISITING MEDICAL OFFICER to a residential nursery at 30, Abercorn-place, N.W.8, which accommodates 15 short-stay children between 9 months and 5 years of age. Remuneration £70 a year, plus fees receivable from Executive Council in respect of children and staff who may be taken on National Health Service list.

Particulars and application form from the Medical Officer of Health (PH/D.1/257), County Hall, Westminster Bridge, S.E.1, and returnable by 11th March.

LONDON COUNTY COUNCIL. Applications are invited from medical practitioners practising under National Health Service for appointment as VISITING MEDICAL OFFICER to a residential establishment at 94, Oakley-street, Chelsea, S.W.3, which accommodates 12 young children, mostly short-stay cases. Remuneration £70 a year plus fees receivable from Executive Council in respect of children and staff who may be taken on National Health Service list.

Particulars and application form from the Medical Officer of Health (PH/D.1/324), County Hall, Westminster Bridge, S.E.1, and returnable by 11th March.

NOTTINGHAM. CITY OF NOTTINGHAM. Health SERVICES. Appointment of MEDICAL LOCUM TENENS. Applications are invited from medical practitioners with experience of Maternal and Child Health for a Locum Tenens appointment from May to September, 1957. Salary will be at the rate of £1050 p.a.

Applications, accompanied by the names of 2 persons to whom reference may be made, should be sent to the Medical Officer of Health, Huntingdon-street, Nottingham, not later than 15th March, 1957. T. J. OWEN, Town Clerk.

Guildhall, Nottingham, February, 1957.

STOKE-ON-TRENT. CITY OF STOKE-ON-TRENT. SENIOR MEDICAL OFFICER (maternal and child welfare). Applications are invited for the above appointment from registered medical practitioners (Women) holding a Diploma in Public Health and having had extensive experience in maternal and child welfare, and general public health work. The salary will be on the Whitley Council scale £1520–£50–£55 (7)–£1955. The person appointed will be responsible, under the direction of the Medical Officer of Health, for carrying out the administrative duties of the Maternal and Child Welfare Section of the Public Health Department and any such duties as the Medical Officer of Health may from time to time determine. The appointment will be subject to the provisions of the National Health Services (Superannuation) Regulations, 1947, and the successful candidate will be required to pass a medical examination.

Applications (no forms) in envelopes endorsed, "Senior Medical Officer (Maternal and Child Welfare)," together with copies of 3 recent testimonials or names of 3 referees, to be delivered to the Medical Officer of Health, Public Health Department, St. Peter's Chambers, Glebe-street, Stoke-on-Trent, not later than 16th March, 1957.

HARRY TAYLOR, Town Clerk.

TREASURY MEDICAL SERVICE. Applications are invited from medical practitioners, practising in the districts detailed below, for appointment, in a part-time and mainly advisory capacity, as LOCAL TREASURY MEDICAL OFFICER for each of the places or groups of places shown. The town shown in brackets after the place-names indicates the Head Post Office Area in which the place, or group of places, is situated. Successful applicants will be required to examine and report on the condition of certain Government Officers, teachers, candidates for appointment, &c., who may be referred to them from time to time; and to attend when summoned to an emergency case of accident or sudden illness occurring in a Government office in the neighbourhood. Fees for this work, and mileage allowance where necessary, will be paid on a scale agreed with the British Medical Association.

Intending applicants should write, within 14 days, to Treasury Medical Adviser, Treasury Chambers, Whitehall, S.W.1, for a form on which application may be made. Applicants should be not more than 60 years of age.

The places for which applications are invited are as follows:—

ENGLAND AND WALES

Erdington (Birmingham, 23).
Corfe Castle (Bournemouth).
Croydon, East (Croydon).
Kenninghall (Norwich).
Nottingham, N.W. (Nottingham).
Willington Quay and Percy Main (Newcastle-on-Tyne).

NORTHERN IRELAND

Downpatrick (Downpatrick).

UGANDA. Medical Officers with qualifications registrable in the United Kingdom required for general duties and to assist with training subordinate African medical staff. Appointment on permanent basis with pension (non-contributory) or on short-term contract with gratuity. Salary from £1284 to £2115 a year, starting point determined by qualifications and experience. Pension earned at rate of 1/600th of final pensionable emoluments for each completed month of service. Gratuity (taxable) for contract service is 13½% of total salary drawn, not including allowances. Candidates in National Health Service may leave but retain superannuation rights up to 6 years and receive gratuity (taxable) of 20% of their salary after engagements. Permanent Medical Officers are eligible to be considered at any time for promotion to super-scale posts in Uganda and other territories in medical administration or, if they possess appropriate qualifications and suitable experience, in specialist posts. Quarters, if available, provided at low rental, furniture supplied at rental of £12–£24 a year. Free passages provided in both directions; for officers serving tour of 30–36 months, 4 air passages for Officer, wife and dependent children or sea passages up to cost of 3 adult fares; for officers serving short tours of 12–18 months, passages for Officer, wife, and all dependent children. Educational subsidies are payable to officers, which vary from £90 a year (or half the school fees, whichever is less), for primary education for first child, to £158 a year (or three-fifths of school fees, whichever is less) for secondary education for third and subsequent children. Education facilities are available in East Africa, though many parents send their children to United Kingdom for secondary education. Income-tax at local rates. Local leave permissible and generous home leave granted after each tour.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD. 117/9/02).

U.S.A.

MENTAL HOSPITAL PHYSICIANS.—These positions involve the performance and supervision of medical care and administrative services for patients in a 2800-Bed mental hospital in the Shenandoah Valley of Virginia. Merit increases, vacation, and sick leave with pay, retirement benefits.

STAFF PHYSICIAN.—2 years of psychiatric experience, at least 1 of which must have been in a mental hospital; licence to practise medicine in State or eligibility therefor; starting salary $8784 per year.

JUNIOR PHYSICIAN.—Graduate from a recognised medical college supplemented by 1 year of rotating internship in an approved hospital; licence to practise medicine in State or eligibility therefor; starting salary $8400 per year.

Apply for the above positions to Superintendent, Western State Hospital, Staunton, Virginia, U.S.A.

SOUTH CORK BOARD OF PUBLIC ASSISTANCE. Vacancy for RESIDENT SURGICAL REGISTRAR (St. Finbarr's Hospital, Cork). Remuneration: £862 10s. p.a.

Application forms and particulars may be obtained from the County Manager, Courthouse, Cork, with whom completed applications must be lodged not later than NOON on Saturday, 9th March, 1957.

SOUTH CORK BOARD OF PUBLIC ASSISTANCE. Temporary vacancy for registered JUNIOR RESIDENT MEDICAL OFFICER (Pathological Department, St. Finbarr's Hospitals). Remuneration: £502 p.a.

Application forms and particulars may be obtained from the County Manager, Courthouse, Cork, with whom completed applications should be lodged not later than NOON on Saturday, 16th March, 1957.

General Practice

For an ***Executive Council post*** *(England and Wales) apply on form* **E.C.16A** *obtainable from the council. Mark envelope "Vacancy."*

SUNBURY-ON-THAMES. Applications invited for VACANCY. List at present approximately 2500. "Designated" area. Premises may be available. Apply on Form E.C.16A before 9th March, 1957, to the Clerk, Middlesex Executive Council, Gloucester House, Gloucester Gate, London, N.W.1.

Hospital Services: Non-Medical Appointments

GUY'S HOSPITAL MEDICAL SCHOOL, London, S.E.1. SENIOR ASSISTANT MEDICAL ARTIST required. Medical experience essential. Salary £490–£600, plus London weighting and superannuation. Appointment for 1 year in the first instance.

Apply to the Secretary.

Miscellaneous

Smith, Kline & French International Company invite applications from suitably qualified Scientists for the position of Head of the Pharmacology Department in their Research and Development Group. The position is a progressive one in an expanding organisation. Candidates should be of Ph.D. standing with a wide knowledge of pharmacological methods and techniques. A knowledge of animal pathology would be an advantage and a good understanding of chemical principles is desirable. The salary paid will be commensurate with the experience, qualifications and ability of the applicant and the importance of the position within the R & D group. The Company work a 5-day week and an attractive contributory pension scheme is in operation.—Apply to the Head of Laboratory Services, Smith, Kline & French Int. Co., 120, Coldharbour-lane, London, S.E.5.

Excellent Suite of consulting-rooms close to Grosvenor-square. Ground and lower ground floor accommodation. Magnificently fitted.—Details from: COLLINS AND COLLINS AND RAWLENCE AND SQUAREY, 3, Chesterfield-gardens, Curzon-street, W.1 (GRO 3641).

Anæsthetist, 35, British, London-trained with higher qualification and considerable experience seeks opening in Australia. Wife S.R.N. ex-Great Ormond-street. Invites suggestions.—Address, No. 284, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimen of urine and £1 1s. fee. Hæmatology. Biochemistry. Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Applicants for posts requiring testimonials copied or duplicated should communicate with MANTON SECRETARIAL SERVICE LTD., 98, Victoria-street, S.W.1 (Phone: VICtoria 0141), who are specialists in this kind of work.

Typewriting and Duplicating. First-class work at moder-ate prices by experienced medical typists. Electric machines.—SYBIL RANG, 21, Heath-street, Hampstead, London, N.W.3 (HAM 5329/0504).

Medical X-ray Unit required; to run at 100 Ma/90 K.V.P. rotating Anode Tube, Shockproof Cables, &c., also required Vertical Cassette Holder for chest radiography.—Please give full particulars to Ref. O.M., Address, No. 280, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Professional, technical and personal typewriting. Dupli-cating, circularising, &c., efficiently and speedily executed.—"MOWBRAY," 146, Bishopsgate, E.C.2 (BIS. 2545, BAR. 7665).

Microscopes. Highest prices paid for good modern types Send or bring your equipment for valuation.—WALLACE HEATON LTD., 127, New Bond-street, W.1.

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